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CHINA'S ECONOMIC DILEMMAS IN THE 1990s: THE PROBLEMS OF REFORMS, MODERNIZATION, AND INTERDEPENDENCE

VOLUME 2

STUDY PAPERS

SUBMITTED TO THE

JOINT ECONOMIC COMMITTEE CONGRESS OF THE UNITED STATES

APRIL 1991

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LETTER OF TRANSMITTAL

APRIL 17, 1991

To the Members of the Joint Economic Committee:

I am hereby transmitting for use by the Joint Economic Committee, Congress, and the public a study assessing the economy of the People's Republic of China entitled, China's Economic Dilemmas in the 1990s: The Problems of Reforms, Modernization, and Interdependence. The study is in two volumes and comprises papers prepared at the committee's request by a large number of government and private experts.

China has made significant gains in the period since economic reforms were introduced more than a decade ago. But in recent years it has experienced serious problems which many experts believe have slowed and perhaps halted the momentum towards liberalization of the economy. The leadership understands that change is necessary to achieve modernization, but fears the instability that might accompany further change. The papers in these volumes examine recent economic performance and policies, and the underlying debate over the basic direction that China should follow.

The study was planned and directed by John P. Hardt, Associate Director of the Congressional Research Service of the Library of Congress, and Richard F Kaufman, General Counsel of the Joint Economic Committee. Leo A. Orleans acted as publications coordinator, assisted by Phillip Kaiser. We are grateful to the Congressional Research Service for making Dr. Hardt and others available to work on the project, and to the many authors who contributed papers.

The views contained in the volumes are those of the authors and not necessarily those of the Joint Economic Committee or its individual members.

Sincerely,

PAUL S. SARBANES,
Chairman.

LETTER OF SUBMITTAL

THE LIBRARY OF CONGRESS,
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Washington, DC, April 12, 1991.

Hon. PAUL S. SARBANES
Chairman, Joint Economic Committee
Congress of the United States
Washington, DC.

DEAR MR. CHAIRMAN: I am pleased to be able to transmit to you a collection of papers on the economy of the People's Republic of China entitled, "China's Economic Dilemmas in the 1990s: The Problems of Reforms, Modernization, and Interdependence."

The study was directed by John P. Hardt, Associate Director of the Congressional Research Service and Richard F Kaufman, General Counsel of the Joint Economic Committee. Leo A. Orleans served as the coordinator of the publication, assisted by Phillip Kaiser. Many CRS and other Library of Congress personnel, as well as government and private specialists, contributed significantly to the project.

We trust that the analyses and information contained in this study will be of value to the Joint Economic Committee, as well as the Congress in general and the broad audience of students of China.

Sincerely,

JOSEPH E. ROSS,
Director.

CONTENTS

Page
Letter of Transmittal III
Letter of Submittal V
Introduction—John P. Hardt and Richard F Kaufman IX

VOLUME 1

I. The Context for Analyzing China

China's Transition to the Post-Deng Era—Christopher Clarke 1
The Dynamics of Internal Policies—Kenneth Lieberthal 15
Power Structure and Key Political Players in China—Chi Wang 29
External Factors Affecting the Economy—Robert G. Sutter 48
Commentators: 65
  China's Biggest Problem: Gridlock, Not Revolution—David Lampton 65
  The Context for Analyzing China—Allen Whiting 70

II. Reforms

Overview—George Holliday 73
The Problematic Future of China's Economic Reforms—Harry Harding 78
China's Mixed Economic System. Properties and Consequences—Robert Dernberger 89
The Performance of China's Economy—Lee Zinser 102
The Cyclical Future of China's Economic Reforms—Albert Keidel 119
Inflation: Patterns, Causes and Cures—Barry Naughton 135
Price Reform vs. Enterprise Autonomy. Which Should Have Priority?—Dwight Perkins 160
Taxation Reform in China's Public Finance—Penelope Prime 167
Regional Economic Differences During the Decade of Reform—David Denny 186
A Systemic Analysis of Prospects for China's Economy—Jan Prybyla 209

III. Social and Human Factors

Overview—Leo A. Orleans 227
China: Population Changes and the Economy—Judith Banister 234
Birth Planning Between Plan and Market: The Impact of Reform on China's One-Child Policy—Tyrene White 252
Social Security for State-Sector Workers in the People's Republic of China: The Reform Decade and Beyond—Lillian Liu 270
China's Environment: Issues and Economic Implications—Baruch Boxer 290
The Economic Costs of Intellectual Alienation—Carol Hamrin 308
The Impact of Mao's Legacy on China's Reforms—Marcia Ristaino 321

IV. Modernization

A. AGRICULTURE

Overview—William Cooper 335
China's Agricultural Policy During the Reform Period—Terry Sicular 340
China's Agricultural Reforms: Evaluation and Outlook—Shwu-Eng H. Webb and Francis C. Tuan 365
Primary Issues in China's Grain Econmy in the 1990 Decade—Frederick W. Crook 385
Loss and Misuse of China's Cultivated Land—Leo A. Orleans 403
Rural Industry: Constraining the Leading Growth Sector in China's Economy—David Zweig 418

Page

VOLUME 2

IV. MODERNIZATION—CONTINUED

B. INDUSTRY

Overview—Phillip Kaiser ... 437
China's Enduring State Factories: Why Ten Years of Reform Has Left China's Big State Factories Unchanged—James B. Stepanek ... 440
Modernizing China's Transport System—Ralph W. Huenemann ... 455
China's Growing Aviation Industry—Charles Barton ... 469
China's Telecommunications and American Strategic Interests—Ken Zita ... 482
China's Energy Outlook—David Fridley ... 495

C. SCIENCE AND TECHNOLOGY

Overview—Genevieve Knezo ... 527
Fragmented Innovation: China's Science and Technology Policy Reforms in Retrospect—Eric Baark ... 531
China's High Technology: Programs, Problems and Prospects—Richard Suttmeier ... 546
China's Acquisition and Assimilation of Foreign Technology—Denis Simon ... 565
China's Space Program—Marcia Smith ... 599
The Effects of Tiananmen on China's International Scientific and Educational Cooperation—Mary B. Bullock ... 611
Perspectives on China's Brain Drain—Leo A. Orleans ... 629

D. MILITARY

Overview—Richard F Kaufman ... 645
Chinese Defense Policy and Military Strategy in the 1990s—Paul H.B. Godwin ... 648
Chinese Military Capabilities: Problems and Prospects—Robert Skebo, Gregory K.S. Man and George H. Stevens ... 663
Interpreting Trends in Chinese Defense Spending—James Harris, et al. ... 676
China in Transition: Military Concerns and Ability to Influence Events—Ronald N. Montaperto ... 685
China Arms Sales: Overview and Outlook for the 1990s—Shirley Kan ... 696

V. INTERDEPENDENCE

Overview—Arlene Wilson ... 713
Costs and Benefits of Interdependence: A Net Assessment—Wendy Frieman and Thomas W. Robinson ... 718
China's Foreign Commercial Relations—Erin Endean ... 741
The Business Climate in China: Half Empty or Half Full?—Martin Weil ... 770
China's Potential for Export-Led Growth—William A. Fischer ... 785
China's Relations with Multialateral Economic Institutions—William R. Feeney ... 795
In Search of Excellence within China's Industrial Sector: The Chinese Enterprise and Foreign Technology—Roy F. Grow ... 817
Chinese Law Relating to Foreign Investment and Trade: The Decade of Reform in Retrospect—James V. Feinerman ... 828
Reform and Retrenchment in China's Special Economic Zones—George T. Crane ... 841
Hong Kong and China in the 1990s—Kerry Dumbaugh ... 858
China's Asian Trade: Opportunities and Dilemmas—John Frankenstein ... 873
U.S.-China Commercial Relations: A Decade after Normalization—Nai Ruenn Chen ... 895
Politics, Pragmatism, and Profits: Sino-Soviet Trade in the 1980s and 1990s—Sharon E. Ruwart ... 912

CHINESE MODEL FOR CHANGE: PROSPECTS AND PROBLEMS

By John P. Hardt and Richard F Kaufman *

In his vision for China, Deng Xioping understood that in order to modernize, the country would have to open up to the outside world, and introduce market forces into the economy. The decollectivization of agriculture was followed by a variety of reforms to adjust the Stalinist system of central controls, but the impressive economic performance over the past decade was accomplished without democratization and without rejecting socialism.

Current models of democratization and transition toward a market economy in Central and Eastern Europe and elsewhere raise many questions about China. How applicable is the experience of the East European countries to the People's Republic of China? Will Western corporations, which favor a competitive market, be deterred from investing in a politically stagnant and economically indecisive China? What are the prospects for further reforms? Is China likely to follow in the footsteps of South Korea's Pak Chung-hi, who built that country's "economic miracle" by combining authoritarian control with some market reforms? Although these are difficult questions to answer at this time, many of the chapters in these two volumes provide a basis for considering the various options open to China. There is general agreement, however, that any major changes in the present system will have to wait for the passing of Deng and his octogenarian colleagues.

Continuity and caution are the hallmarks of the 8th Five-Year Plan (1991–95) and the 10-year development program for the 1990s. Official discussion of the plan in January 1991 was cautious in emphasizing a need for greater efficiency but suggesting that for now Chinese party leaders are rejecting any radical changes in their economic system. No mention was made, for example, of any steps which would resolve the problems associated with government subsidies to the large and inefficient state enterprises, to the transportation system, and to the privileged urban population, which pays a fraction of the market value for both food and housing. Instead, the new plan seems to focus on reducing uncertainties and only fine-tuning some of the existing policies with regard to prices, finance, taxation, banking, planning, investment, labor and wages.

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* John P. Hardt is Associate Director, Congressional Research Service, Library of Congress. Richard F Kaufman is General Counsel, Joint Economic Committee, U.S. Congress.

BLUEPRINT FOR THE FUTURE: CONTINUITY AND CAUTION

Continuity of the political framework for the economy was taken as a given. However, unable to force uniformity throughout the country, the weakened central government is no longer micromanaging output levels and materials allocations in all areas, and is searching for policies that would reduce the huge regional differences that now exist between the Special Economic Zones, the large municipalities, and some of the coastal provinces, on the one hand, and the less developed heartland of China on the other hand. Since 1988 there has been a partial reversal of the more liberal economic policies of the mid-1980s. This trend was reinforced after the Tiananmen incident in 1989, strengthening the hands of China's reactionary faction which had opposed many of Deng's market-oriented reforms.

The experiences of other socialist countries which have attempted to reform their economies suggest that a comprehensive approach is necessary. Eastern European countries which have reformed their political systems by making them more democratic have also made the most progress in reforming their economic systems and show the most promise for the future. These efforts contrast sharply with the failed gradual, partial and ambiguous reform efforts of the past. A recent report by several of the largest multilateral financial and economic institutions urges that the Soviet Union implement a comprehensive program of systemic reforms involving the legal, financial, and trade systems, and other vital sectors of the economy.

How relevant are these verdicts to China? Could and should China combine development of political pluralism with a rapid fundamental transition to the market? As might be noted in these volumes and the broader literature, there is no agreement among the China analysts outside or inside the PRC. Some believe that political reforms must go hand-in-hand with, or even precede, economic reforms; others agree with the Chinese leadership and maintain that given China's level of development and her traditional cultural orientation, economic successes over the past decade required social order and could only have been achieved under strong central authority. However, even those who agree with the past necessity of the unique Deng model would question its continued relevance and potential for improving performance.

PERFORMANCE

China's economic performance in the 1980s was a success by most measures. In this decade of reform, the economy expanded at an annual average rate of about 10 percent, living standards and consumption more than doubled, and for most of the period inflation was kept under control. By the end of the decade, China's foreign trade had more than tripled and the PRC had become an important player on the global economic stage. In 1989 China was the world's 13th largest exporter and total trade was equivalent to about one-fourth of its gross national product.

But in the late 1980s, it began experiencing serious problems. Rapid industrial growth intensified shortages of energy and raw materials, and led to transportation bottlenecks. An austerity program was implemented in 1988 to cool the overheated economy and to control inflation which had been accelerating since 1985. Restrictive policies, including sharp cutbacks of credit and added price controls, were effective in dampening inflation. In the process, reforms were put on hold and in some cases reversed; economic growth slowed to about one-third the average for the earlier part of the decade, and unemployment increased. While sustained hyperinflation was avoided, the underlying causes of inflation remain: weakness of the banking system and a tendency in normal times toward excessive growth of credit, protection of inefficient state enterprises, and the distortions caused by the price system.

Beijing extended the austerity program to the foreign sector. To rein in the growth of trade, trading authority was recentralized and a larger share of exports and imports were subjected to controls. The Tiananmen crisis resulted in reduced resource flows from abroad, accelerating the deterioration in the current account balance and the rise in debt service requirements that were already underway. For example, tourism declined sharply, foreign investors postponed projects, and there was a drop in commercial lending. However, these repercussions may prove to be temporary.

Underlying Dilemmas in Deng's Modernization Formula for the Future

As China enters a new economic planning period, the leadership appears indecisive about its critical economic dilemmas. There is a tug-of-war within the political hierarchy over the basic direction China should pursue; and there are differing opinions at this time among the top economic advisers as to the most promising steps that should be taken in order to improve economic performance and raise living standards. Chinese leaders seem to understand that some more basic economic reforms are a prerequisite to modernization, but want to make sure that such reforms are not accompanied by inflation, inequality, corruption, and disorder. The leadership knows, for example, how important it is to continue price reforms, but seems unsure as to when, how, or how quickly to introduce price revisions and the idea of decontrolling prices has been postponed indefinitely. It knows that the door to the outside world must be kept open, but it also fears creeping foreign intervention and subversion of traditional values by the westernization of Chinese society. The leadership understands the need for substantial change, but also requires political, social, and economic stability and fears change will bring about instability. The difficulty foreign observers have in predicting the direction China is likely to take during the coming decade is simply a reflection of the indecisiveness the Chinese themselves are experiencing as they try to balance forces for change and continuity.

The successes of Deng's modernization from 1978 to date notwithstanding, and no matter what mix of market and planned economy China chooses to adopt in the next decade, there are certain dilemmas and contradictions that will have to be faced and that will be more difficult to resolve than in the past. The fact that most of these problems are familiar and in no sense new does not in any way diminish the difficulties they raise. That is why even many of those who supported Deng's model in the past may have second thoughts about the future. Many Western experts would agree that Beijing will not be able to achieve both rapid economic expansion and price stability under the present economic system.

HUMAN FACTORS: MALTHUS REVISITED, WILL POPULATION EXCEED SUBSISTENCE?

China's population, now well over 1.1 billion, is increasing by almost 15 million every year. Because of increasing difficulties in imposing sanctions on couples exceeding the planned number of births, because a large proportion of the population currently is of prime reproductive age, and because of low mortality, the rate of population growth is not likely to decline during the 1990s. By the year 2000, China's total population is expected to be close to 1.3 billion.

China faces serious employment problems as it moves from a labor-intensive society to one that is more capital-intensive. This has been especially true in the most recent years, with some 20 million people being added to the labor force every year. Jobs were created during the boom years of the 1980s for the growing working age population, but economic retrenchment, which has reduced the labor absorption capacity of cities and rural industries, has caused unemployment and a large "floating population" of migrant workers. Also, China's aged population is expanding, and that will create an additional burden on the country's productive labor force to provide a safety net for the old and less employable.

While modernization will require an ever better educated labor force, China's per-capita expenditure on education has been decreasing. The illiteracy rate is still holding at over 20 percent. Even more distressing to the authorities is that the attendance rate of school-age children has been going down and the dropout rate has been rising.

MODERNIZATION OF AGRICULTURE

China has 22 percent of the world's population and only 7 percent of the world's farmland. For three decades, agricultural production has fluctuated widely due to natural disasters, faulty national policies, and local mismangaement, but in the period of reform, Chinese agriculture has demonstrated major achievements. By reducing the role of administrative controls and increasing the role of market forces during the 1980s, the gross value of agricultural prodcution nearly doubled, and productivity and farm incomes rose sharply.

Understandably, agriculture, which must annually produce more just to keep up with the population growth, continues to be listed as one of China's top national priorities. However, because of its much higher level of productivity, it is unrealistic to expect the agricultural sector to continue its rapid increase into the 1990s. Moreover, it will be facing some serious problems: (1) lacking adequate legal protection and unsure of their land tenure rights, peasants have felt insecure and unwilling to invest in their land, thus inhibiting development; (2) it is difficult to introduce modern technology and improve efficiency when peasants operate "stamp-size" plots—

a condition that is not likely to change soon; (3) too much money and labor have been diverted from agriculture to rural enterprises, which now account for over one-quarter of China's industrial production. Some Chinese officials propose consolidating farms and reassessing administrative controls, but the consensus abroad is that agricultural success can only come if China stays with market-oriented reforms.

INDUSTRIAL MODERNIZATION

Industry made significant progress in the 1980s, especially in areas where foreign investment and joint ventures have been encouraged, such as civil aviation. Industrial production has also increased greatly in township enterprises and collective factories. Nevertheless, serious problems remain and progress may be at a standstill unless more resources are allocated to infrastructure improvements and unless the path of market oriented reforms in manufacturing is resumed.

One obvious problem is that industrial reforms have not been extended to the large state-owned enterprises which are managed in about the same way they always have been under central planning. A growing proportion of these enterprises depend on government subsidies. Elsewhere in industry there has been a suspension of efforts at economic liberalization and deregulation. The trend since 1988 has been toward greater centralized control. In addition, limited budget resources and scarce hard currency hold back efforts to modernize the infrastructure.

There was a significant expansion and upgrading of equipment and facilities in transportation and telecommunications, but railroad and highway transportation have been unable to keep up with demand and telephone service is among the poorest in the world. These problems, together with shortfalls in energy production, may constrain the future expansion of industry and, in turn, the overall economy.

MODERNIZATION OF SCIENCE AND TECHNOLOGY

Science and technology continue to receive top priority from Chinese leaders who have long hoped that advances in this area would lead to accelerated economic and military modernization. China has many accomplishments in fields of technology including biotechnology, space, lasers, energy, and advanced materials. But a variety of bureaucratic, ideological, and cultural attitudes among conservatives and the old guard, and the rigidities of central planning, impedes progress especially with regards to innovation and commercial application. As a consequence, investments in science and technology have produced large numbers of scientists and engineers, but disappointing economic benefits.

The control of science and technology by the state has led to the bottling up of research results in ways that have deprived the civilian economy and the military from more productive sources of innovation. For now, the leadership understands that China must utilize foreign technology to avoid falling further behind the West. Its acquisition, however, has not been matched by an effective program of diffusion and assimilation.

MILITARY MODERNIZATION

Beijing reduced defense spending during the 1980s, along with the size of the Army. While some streamlining in military organization took place, weapons modernization, logistical support and combat capabilities fell and are not on a par with some of China's neighbors much less the West. Lut defense strategy and policy have recently changed, and for the first time in many years defense spending increased in real terms in 1990. Because of the tradeoffs between modernizing the defense sector and the rest of the economy, such a shift is bound to increase budget deficits, and make it more difficult to finance other activities.

OPENNESS AND MODERNIZATION

Foreign trade and investment from abroad made important contributions to China's modernization in the 1980s. Despite a halting start, China has greatly improved its commercial relations with the outside world. There is still interference by the bureaucracy, and there are still many concerns about legal restrictions imposed on traders and investors, but Beijing is making efforts to enhance the commercial climate and there are no signs that China's policy of modest opening to the world is likely to change. At this time, China's greatest worry regarding foreign economic relations may well be Western concerns about the uncertainty of post-Tiananmen policies, and the competition from Eastern Europe, the Soviet Union, and other areas for foreign investment, credits, and tourism.

Over the years there have been numerous heated arguments among both scholars and bureaucrats studying China not only about where China is going, but also where China has been. The most common assessment, and one that caused little past debate, is that China has been able to "muddle through." It is impossible to summarize the views of almost 60 scholars who have contributed to these volumes, and yet it is safe to say that they all would agree that despite China's innumerable problems, she may continue to "muddle through." In fact, the great majority of the contributors would be more optimistic than that. As long as the current leadership is in power, China will seek the impossible: a market-based system within a socialist planned economy in a one-party state. But before the decade is out the leadership will change and the desire for modernization, competition from her market-oriented neighbors, and pressures by a populace with new ambitions and expectations will force China to find a more efficient system. What precisely the new model will be no one can predict, but it is more than likely that the trend toward a market economy will continue, albeit with Chinese characteristics.

B. Industry

OVERVIEW

By Phillip Kaiser *

Over the past decade, significant advances have occurred in many of China's industrial sectors, including communications, transport, energy, and aviation, which are especially critical to economic development. However, the growth experienced by these sectors has been unable to keep pace with the demands engendered by China's rapid development so that communications, energy, and transportation have become serious bottlenecks to future growth. To make matters worse, the response of the current leadership to the economic and political problems which arose during the second half of the 1980s, is to revert to greater centralized control and planning. The authors agree that the unwillingness of the government to continue with market-oriented reforms will delay modernization and inhibit efficiency. Moreover, as new opportunities have opened up in Eastern Europe and the Soviet Union, China faces greater competition in attracting foreign investment and joint ventures, without which economic modernization will be hampered.

The energy sector provides an example of both the progress made and the difficult prospects ahead. As David Fridley points out, in the 1980s energy production increased substantially. By 1989 output of hydropower was up 100%, coal up 68%, and oil up 30% over 1980. However, as new coal-fired power plants have come on line and the iron and steel industries have expanded, demand has increased even more. Power shortages and temporary blackouts have been experienced in some areas. In the oil industry profits have evaporated because while the policy of providing industry with low-cost energy persisted, the costs of producing oil continued to rise. Without an injection of funds the exploration and development of oil reserves will be crippled. According to Fridley, the growing imbalance between energy supply and demand will cause China to experience "a prolonged and chronic energy shortage."

In the area of telecommunications the situation is also troublesome, with vast disparities between urban and rural areas, and generally poor service. In fact, Ken Zita points out that "basic telephone service is among the poorest in the world, and the lack of computer-to-computer data communications is a major bottleneck in China's economic reforms . . ." In spite of an increase in phone

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* Philip Kaiser, Consultant, Congressional Research Service.

lines and improvements in service since 1979, the number of telephones is "well below even the developing world's average."

Development of telecommunications is hampered by regional and ministerial turf battles, and a lack of sufficient financing. Some of the problems could be overcome if administrative responsibility for research and development and manufacturing were not split between two competing ministries, which wastes resources according to Zita. Private networks are increasing and their further development may help the modernization process. The army, railways ministry, and national bank have or are developing such systems.

Zita also points to the "double edged sword" aspect in introducing advanced technology into the country. On the one hand, technology which improves public communication is likely to enhance the prospects of democratization; on the other hand, it would allow Beijing to monitor thousands of calls simultaneously.

The past decade "has been the most fruitful in the history of Chinese aviation," according to Charles Barton. Both passenger and freight traffic have increased dramatically (although from a very low base). Increased domestic demand as well as foreign business and tourist needs are likely to outpace the ability of China to provide services. This growing sector, with ten new airports planned and increasing numbers of aircraft, will find current support services such as air traffic control and navigation services to be insufficient.

In the production of aircraft and aircraft components, China has done well. Serving essentially as subcontractors, Chinese factories have supplied components to companies such as GE, Pratt & Whitney, Boeing, and McDonnell-Douglas. China has also found an export market for the aircraft it produces in developing countries such as Laos and Sri Lanka. The government sees commercial production of aircraft as an important opportunity for industrial growth.

Transportation bottlenecks are a serious constraint to economic development. While this sector has also experienced considerable growth, it has not kept up with the demands of either freight or passenger traffic. Ralph Huenemann points out that although there is severe overcrowding in all modes of people transport, it is especially bad in passenger rail traffic, which is also an excellent illustration of the interconnected nature of the various industrial sectors. Increases in passenger rail traffic exacerbate the bottlenecks in freight traffic which, in turn, cause delays in trains carrying coal (the bulk of which is carried by rail), which then exacerbate the country's energy problems.

While many needed improvements were made in the rail system in the 1980s, much more needs to be done to modernize it. China is already in the process of changing from steam to new diesel and electric engines, and by now almost half of the locomotives are non-steam. In the future, China hopes to improve her railroads by introducing a variety of new technologies, including the highly desirable but expensive computerized signalling system.

In highway construction the focus in the 1980s has been on upgrading existing routes rather than building new roads. The number of unsurfaced roads has decreased and the quality of highways is improved. Roadway traffic has increased dramatically and this has reduced some of the burden on the railroads, as well as providing more efficient handling of short-haul shipments.

The transport of freight on waterways has increased significantly in the past decade, but inadequate port and dredging capabilities restrict water transport growth.

Perhaps the biggest disappointment, from the perspective of reform of industrial capacity, is the unchanged nature of large state factories, discussed by James Stepanek. For the most part they remain the inefficient core of China's planned economy. Protected from most competition, and increasingly requiring subsidies, they typically use excessive amounts of labor and capital. Moreover, intense regionalism and rivalries between the central and local governments for control cause duplication of efforts and inefficient allocation of resources.

In China individual enterprises are not simply production units, but must also provide their workers and staff with schools, housing, health care, and other services. Such a system is an obvious distraction to the main production goals of the enterprise, and an administrative nightmare to its managers. As they are now constituted, state factories also inhibit worker mobility and therefore represent a serious disincentive to private enterprise. A worker contemplating leaving such a position would be giving up his "iron rice bowl:" a permanent job, health care, housing, education for the children, and retirement benefits. Since the government finds it difficult to "close" what is essentially a small city, and thereby face the wrath of the workers, inefficient plants continue to operate throughout China.

As the decade of the 1980s came to a close the Chinese leaders could look at major accomplishments in the industrial sector, as well as increasingly apparent and interconnected bottlenecks. At the same time, they showed a persistent willingness to recentralize control. As China enters the 1990s, it remains to be seen whether the leadership will be willing to take the steps necessary to provide incentives for domestic production and to attract foreign investment in an increasingly competitive global market. Great hurdles will have to be overcome for further development of China's industrial sector.

CHINA'S ENDURING STATE FACTORIES: WHY TEN YEARS OF REFORM HAVE LEFT CHINA'S BIG STATE FACTORIES UNCHANGED

By James B. Stepanek *

CONTENTS

	Page
Summary	440
I. The Early Years of Reform	440
II. Penetrating State Factories	441
III. Behind the Gates	442
IV. Decentralization, Round Three	443
V. A Look Inside a Model State Factory	444
VI. The Inherited System	446
VII. Factories as Self-Contained Islands	447
VIII. Danwei Socialism	448
IX. Rigid Work Rules	449
X. The Role of Foreign Joint Ventures	451
XI. Factory Autonomy	451
XII. Conclusion	453

SUMMARY

China's "reform decade" of 1979–89 failed to achieve management reforms in state factories because of the government's reluctance to terminate subsidies to state factories. Planners refused to cut off subsidies principally for two reasons. First, to penalize a factory—the main vehicle of social services—for poor management would have serious social consequences in the absence of a nationwide net for the unemployed, sick, and uninsured. Secondly, the profits and taxes paid by state factories provided the central government with the largest share of its revenues.

I. THE EARLY YEARS OF REFORM

When Deng Xiaoping was in the United States in 1979 he toured the Ford auto plant in Atlanta. Remarkably, he allowed that visit to be shown on Chinese TV. That was an unprecedented event. China had suppressed news about the U.S. moon landing and other world events, and told its people that Chinese factories had substantially caught up with ones in the West. The brief glimpse of an automated car factory on TV showed just how far behind China was, and it sent a message to Chinese industry that the government would tolerate complacency no longer.

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Back in China, Deng energetically pursued his reform program. The results were spectacular. By the mid-1980s agricultural output was soaring. Industrial production by township and collective factories grew impressively. Private markets flourished. Trade with the outside world doubled during the years 1978 and 1979, which ushered in a period of closer ties with the West. Contacts with foreigners grew. In one minor incident, the government allowed the Gezhouba Construction Bureau to talk directly with Caterpillar Corp. of the USA for the first time in March 1980. Caterpillar's D9 bulldozers had arrived in China a few years before, and vanished. The Chinese refused to reveal who the end-user was. Everything was a state secret. Though seemingly a minor reform, the simple step of allowing people to communicate directly with each other sent information from the outside world surging throughout the entire economy.

A stunning admission in 1980 by the Chinese Vice-Premier at the time, Bo Yibo, was that Soviet-style central planning did not work. Henceforth, the government would experiment with "interest rates, taxes, and prices" to control China's economy.[1] A total of 6,600 factories were singled out for accelerated reform, which began the slow process of bringing back many "capitalist" management practices condemned in the Cultural Revolution, such as increasing the importance of profit as a planning tool, allowing factories to sell "above plan" products on their own, and giving local government more control over a factory's retained earnings.[2]

New slogans reflected the sense of excitement. At factory gates, the big red Chinese characters, four on the left and four on the right, were repainted. The new slogans said "Customers First, Quality Tops!" and things like "Small Margins, Big Sales!" The old Cultural Revolution couplet, "Heighten Vigilance, Defend the Motherland!" was taken down everywhere except at places like the Beijing Ordnance Factory and Norinco battle-tank testing range west of the Marco Polo Bridge.

II. Penetrating State Factories

That amazing period of rapid change has come and gone, leaving many things intact. The reforms, for all their impact on collectives, hardly penetrated China's state-owned factories. These are the grey buildings on the horizon that stand well behind the colorful street markets and China's gleaming international hotels. These factories are the core of China's planned economy. Because they seldom see them, most foreigners imagine these big factories operate much like China's small factories, the dynamic export collectives that are filling America's store shelves with appliances, apparel, and toys.

But the big state factories are operationally unique. They are laid out on a grand scale. They consume the nation's best resources in prodigious quantities. A few make enormous sums of money for the state, including the many plants that exploit China's vast reserves of minerals and produce rationed consumer goods. However, a growing proportion of state factories depend on subsidies—the government openly acknowledges—equal to about one-half billion dollars a month in the first half of 1990.[3]

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[1] "Vice-Premier Bo Yibo on China's Current Priorities," *The China Business Review*, November-December, 1980, p. 10-11; and "China's Planning System in Transition," *The China Business Review*, November-December, 1980, p. 15-19.

[2] Thomas H. Pyle, "Reforming Chinese Management," *The China Business Review*, May-June 1981, p. 7-19.

These losses are a major concern of the central government, since the profits and taxes from state enterprises are the linchpin of Beijing's budget.[4] Moreover, declining revenues have caused the central government to lose influence over China's provinces and major cities, which were in a stronger financial position than the central government in the late 1980s and now control more than half of total revenues.

III. Behind the Gates

A few steps inside the front gate of a state factory reveals how little has changed. Many plant managers I first met in 1980 were still doing essentially the same jobs in 1989. The cavernous buildings, unhurried pace of work, and fatuous briefings probably have changed little since the Polish, Czech, and Russian technicians helped build these plants in the 1950s. As an American businessman in China I had to know who really controlled the large state factories and who were my customers. Western press reports about China's reforms completely missed what I was seeing. For those of us working inside the gates of state factories, the only useful published guides were the Old Testament writers on China's economy, like Barry Richman, Ta-Chung Liu, Audrey Donnithorne, and Franz Schurmann.[5] They warned about the system's rigidity. So prophetic were their warnings, that the much-heralded changes that swept across China in the 1980s never touched the large state factories, and the few reforms that did penetrate their front gates were merely dusted off experiments from an earlier era.

One example is free markets. Beginning in the late 1970s, free markets were reintroduced, first in agriculture and then in urban retailing. Most of China's leaders, except for those who denounce "petty capitalism" in all its forms, have always advocated that a centrally planned economy needs free markets around its edges. Private barbers and vegetable hawkers can do no harm, if kept to their side of the street. To the horror of conservative leaders these petty capitalists not only flourished in the 1980s, but brazenly crossed the street. They set up private stores that threatened state stores, and private trucking companies that offered factory-to-factory service that undermined the state supply system.

Most alarming of all, the entrepreneurial spirit infected local officials, who enthusiastically expanded these profitable businesses, which in turn reduced their financial dependence on Beijing. This sharpened the conflict between China's two power blocks: China's governors and mayors, on the one hand, and the central government leaders, on the other. They are engaged in a historic competition, despite the fact that they are all Party members and believe in socialism, as far as anyone can tell. In the absence of open debates or a free press, all that can be seen of the political differences at the top are vague shadows cast upon the factory floors of China. The provinces and cities back collective and private enterprises and give first priority to foreign investment that earns money for the local government regardless of how low-tech it may be. In contrast, the central government has spent nearly $23 billion on Western technology and equipment and put nearly all of it in state enterprises, where much of it is being wasted.[6] For example, I got a call from an end-user complaining that our high-density recorder did not start. Our technician discovered that the $100,000 recorder had been sitting untouched in its box for four years.

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[3] Nicholas D. Kristof, "At the Businesses Owned by Beijing the Ink is Red," *The New York Times*, November 18, 1990, p. 2E.

[4] James McGregor, "Beijing Faces Tough Choice between Reform and Political Ideology in Charting Economic Course," *The Asian Wall Street Journal Weekly*, October 29, 1990, p. 17.

[5] See, for example, Barry M. Richman, *Industrial Society in Communist China*, New York: Vintage Books, 1969; Ta-Chung Liu and Kung-Chia Yeh, *The Economy of the Chinese Mainland: National Income and Economic Development, 1933-1959*, Princeton: Princeton University Press, 1965; Audrey Donnithorne, *China's Economic System*, New York: Praeger Publishers, 1967; and Franz Schurmann, *Ideology and Organization in Communist China*, Berkeley: University of California Press, 1966.

IV. DECENTRALIZATION, ROUND THREE

Another old reform that reappeared in the late 1970s is decentralization. An example of decentralization is a factory under central government control that is turned over to a lower administrative level like a city, and hence "decentralized." Advocates of decentralization believe that a factory runs better if it is taken out of the hands of bureaucrats in faraway Beijing and put in the hands of local bureaucrats in Tianjin or Huhehaote, or wherever the factory is located. Decentralization was twice carried out in earlier decades, and twice abandoned. The government of Premier Li Peng is now attempting to re-centralize the economy for a third time.

But decentralization will be hard to reverse. It would require changing the policies that promote decentralization, the main one being the policy known colloquially as "who establishes, who controls, and who utilizes," or *shuijian, shuikong, shuiyong*. "Who establishes" refers to the level of government making the initial investment. Thus, if a township government invests in a factory, it basically controls it. As the words "who utilizes" imply, the township government would also get to keep the after-tax revenues from that factory.

This principle allows local governments to enjoy the fruits of their investments. The principle also provides the mechanism that is driving decentralization forward, for as local governments expand their investments faster than the central government, more enterprises come under local control and are "decentralized." For example, Factory 4 at the Sichuan Instrument Plant was financed by Beijing and pays profits to Beijing. But Factory 20 at the same plant is being financed by the Chongqing municipal government, which hopes to make a big profit for the city. Factory 20 is an example of a "decentralized" unit within a larger "centralized" state factory. Confusing cases like this make it hard to pin down the number of decentralized plants in China, though managers have told me that most state factories are decentralized and virtually all have some component of local control—workers in even the largest state factories are normally hired through local labor bureaus, for instance.

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[6] *Beijing Review*, November 6–12, 1989, p. 18–19.

Thus, it is Beijing's poor financial health and inability to make new investments that are frustrating Li Peng's efforts to recentralize industry. The drop in foreign loans to China after Tiananmen added to Li Peng's frustrations. The large investments needed by the state sector—to shift resources away from provinces and cities and back into the planner's grip—can only come from Western financial institutions.

To those of us conducting business in the state sector, September 1988 was a turning point as important as, if less publicized than, the Tiananmen massacre that occurred ten months later. That was when the conservative leaders in the central government finally shouted, "Enough!" and seized control. They consolidated control at the third plenum of the thirteenth Chinese Communist Party Central Committee—exactly ten years after Deng launched his reforms at the now-historic third plenum of the eleventh CCP Central Committee in late 1978.

The government immediately stopped conducting minor renovations of state factories, and rushed to fortify the Soviet-style planning system that had been condemned as being too rigid ten years earlier. The number of state plan items was increased from 19 to 29. This helped the government expand its control of top priority commodities in order to ensure the survival of central planning. By gaining control of ten additional key commodities, the government also took over the many factories producing these commodities.

Every single state factory threatened by closure or bankruptcy by the economic downturn in late 1989 was quickly subsidized. A group of 234 "large and medium-sized" state factories received emergency injections of cash.[7] When conditions failed to improve in 1990, subsidies continued, despite the fact that the share of state enterprises losing money exceeded one-third,[8] or was as high as two-thirds, according to one unofficial report.[9] These moves make it clear that state factories are too important to reform. As we will see below, the central government cannot discipline factories that lose money, and it lacks any incentive to change those that do make money.

V. A Look Inside a Model State Factory

The Zhengzhou Coated Abrasives Works makes sandpaper and other abrasive materials, and also boasts its own high-rise hotel and dairy farm that produces real ice cream. Before a plant tour begins, visitors are served large quantities of hot tea and statistics. The statistics trumpet the size of the factory's floor space and its large inventory of imported equipment. The plant is clearly a big success. Awards cover the walls of the conference room. A plaque from Henan Provincial authorities calls Zhengzhou a technological "pace setter." Another from the State Economic Commission in Beijing praises its contribution to the sixth Five-Year Plan. Amidst the awards is a photo of the factory grounds taken from an airplane. China's big state factories love to print these "bird's eye view" or *niaokantu* photographs in their literature, because only from an airplane can one see all the buildings and surrounding walls and gates.

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[7] *The Herald Tribune*, March 6, 1990, p. 15.

[8] *The Economist*, October 20, 1990, p. 38

[9] James McGregor, "Beijing Faces Tough Choice between Reform, Political Ideology in Charting Economic Course," *The Asian Wall Street Journal Weekly*, October 29, 1990, p. 17.

Inside the Zhengzhou facility, the factory buildings are spacious and poorly utilized. Heaps of materials in-process testify to the factory's ability to hoard raw materials. The air is foul. Nobody fixes the dryers leaking hot air. Imported machinery is in disrepair. The only people who cannot read the "Safety First!" slogans in Chinese are the foreign visitors, who also happen to be the only people wearing helmets.

After one tour, my business colleagues and I returned to the conference room for a wrap-up meeting. Because we hoped to make another sale, we did not mention our main finding: that with the same equipment but with only one-fortieth of the work force in a far smaller space, Zhengzhou could produce more. A lecture was not in order. They knew the facts as well as we. Instead we congratulated Zhengzhou for getting more foreign currency from the government, and turned to the matter of contract terms. We lowered our price again and made the sale, giving Zhengzhou even more equipment it could not use.

The Zhengzhou Works is one of roughly 10,000 *zhongdian*, or "key" state factories that report to Beijing. They are the pillar of Chinese industry. They account for less than a tenth of all state enterprises in China, but produced in 1989 most of the state sector's industrial output.[10] Despite the subsidies many receive, these enterprises as a group still provide the government most of its tax and profit revenues. In return, the government lavishes everything on these factories—the best engineers, preferred access to resources like coal, steel, and foreign exchange, and cheap water and electric power. Even in the dry north, water and power are heavily subsidized. For example, the city of Qingdao suffers shortages of both power and water, but its key state factories were charged less than 2.5 U.S. cents for each kilowatt of electricity consumed in 1989 and less than 5.0 U.S. cents for each cubic meter of water. This is roughly 4 and 12 times cheaper, respectively, than the rates charged American factories in the water-rich and highly electrified New England states.

Meanwhile, the government does little to encourage private and collective plants, which have nevertheless flourished. Since 1980, virtually all of the net increase in industrial employment has occurred in private and collective firms.[11] In the southern provinces of Guangdong, Fujian, Jiangsu, and Zhejiang, these plants produce more than the state sector by a wide margin. Today Guangdong challenges Shanghai for first place in industrial output—up from only half of Shanghai's output in 1984—due to the growth of private and collective industries in just six years.[12] Altogether there are roughly 1.8 million collectives of all types in China, and more than 5 million private establishments. They have continued to top the production statistics in 1990 despite Beijing's threat to shut their doors if they compete against state factories.

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[10] Robert Delfs, "Coming of Age," *Far Eastern Economic Review*, October 25, 1990, p. 17; and *China Market*, No. 12, 1989, p. 12-15; and James McGregor, "Beijing Faces Tough Choice between Reform, Political Ideology in Charting Economic Course," *The Asian Wall Street Journal Weekly*, October 29, 1990, p. 17.

[11] Carl Riskin, *China's Political Economy: The Quest For Development Since 1949*, New York: Oxford University Press, 1987, p. 354.

[12] *Far Eastern Economic Review*, March 15, 1990, p. 38.

These statistics really mean something: collectives differ radically from state factories. For example, I once spent the night in a guest house next to a collective factory in Sichuan. Its machine tools made so much noise I went to see what was going on. At 8 p.m. it was still turning out tractor parts. Everybody was busy. At the state factory I was visiting the workers regularly quit at 4:00 P.M. In the morning I asked my hosts about the collective. I said I was impressed. It reminded me of Taiwan factories years ago. My hosts thought this sounded funny. They assured me, "it's only a township factory." Its technical level is low, they said. It uses anything. Even scrap. The only people who support it are the customers.

That was my last visit. The state factory didn't have anything to export. We had been trying for years to find something to export so that they could pay in dollars for equipment I hoped to sell them. Looking back, why they failed to export is best summed up perhaps in that five minute chitchat about the humble tractor parts factory that satisfied "only" customers.

VI. The Inherited System

Interestingly, state factories trace their origins to the Soviet Union, and before that to the capitalist giants that appeared nearly a century ago. Henry Ford's mammoth automotive complex on the Rouge River was an example of the totally integrated plant that later stirred the imagination of Soviet and Chinese planners. As the wall of ignorance about the outside world rose higher, the Russians and Chinese nevertheless held to their vision—to build immense factories with forests of chimneys and thousands of workers, and to build them in the shortest possible time. China threw itself into its first Five Year Plan beginning in 1953-57 in an effort to dot the country with industrial behemoths. An entire generation passed before the Chinese realized that the integrated capitalist giants had long since given way to more specialized forms of industrial organization.

Following the received Soviet wisdom, the Chinese also erected a planning bureaucracy. People trained in Marxist economics began to run everything by decree, without a free marketplace in either prices or ideas. And like their Russian advisors, they purged from their minds the concept of money or profit and learned to think in physical terms alone. As a result, building a factory was thought of as putting quantities of steel, cement, and other physical inputs together at the correct time and place, and running a factory was even easier, in theory, because the steel, parts, and so forth were combined according to fixed ratios handed down by ministries and these ratios changed only when a new factory was built.

Finance and law, two essential policy instruments in most of the world, play a minor role in this management scheme of things. Banks release money only when they see the *gaizhang* or seal of the competent planning authority. A factory can have a million dollars in the bank, but cannot touch it without the *gaizhang*.

The laws promulgated by China in the past ten years fill entire walls in Hong Kong law firms, and these laws play a role in China's foreign trade. However, inside the state sector, ministry regulations remain as good as law, the state plan is law, and what the bureau director says is better than law because it overrules the utterances of all officials below the director level. For example, in March 1985 a factory ordered that high-pressure agricultural pumps made in Beijing for export to St. Paul, Minnesota, be stamped "Made in the Philippines." This policy violates China's own customs regulations, not to mention U.S. law, but a foreign trade bureau chief nevertheless approved the order. He said many parts were being stamped "Made in Hong Kong" so it surely didn't matter.

VII. FACTORIES AS SELF-CONTAINED ISLANDS

A small Chinese town is erected each time a state factory is built. For example, what had been a desolate patch of gravel along a shoulder of the ancient Silk Road is, 20 years later, the Baoji Nonferrous Metal Works—the nation's leading producer of titanium sheet and tubing for the nuclear industry. More than 50 structures were built including dwellings for 10,000 people. Likewise, the Northeast General Pharmaceutical Factory is located inside Shenyang, yet separate. It occupies more than a million square meters of urban space. Within its high walls a town has been built, with 236 school teachers and vocational education instructors, and its own construction company to build the factory's roads, stores, and apartments. One gets the impression that making vitamins and hormones is one of the community's least important activities.

These supporting facilities consume a big share of factory revenues and confront managers with a confusing array of community problems that have nothing to do with production. For example, the Capital Iron and Steel Corporation in western Beijing employs approximately 135,000 staff just to grow vegetables and rice, run the schools, parks, buses, theaters, and bakeries that support the less than 15,000 workers who actually make steel. The same situation exists at the 650,000 kilowatt Liaoning Power Plant, which has 3,000 workers. But only 20 technicians and roughly 100 maintenance engineers are needed to run the plant. At least a quarter of all state factory employees are "surplus," according to the China Enterprise Management Association.[13] Because state factories give preference to worker's children, the redundant staff are often the worker's own family members.

Today every state factory is essentially a small municipality with roads, theaters, schools, and hosts of other services that in other countries would be provided by local governments. Under the circumstances it is perhaps easy to forget that these factories were originally built to make things—to produce—and not to provide social services to thousands.

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[13] *The International Herald Tribune*, October 30, 1989, p. 13.

VIII. DANWEI SOCIALISM

Factory directors often hear the flattering words, "you are really a mayor." Their responsibility for both production and social services makes it hard for foreign visitors to think of any parallel position in the West, unless the mayor of Corning, New York, were also the president of Corning, Inc., the giant multinational corporation. But visitors are also forced to ask, "how does the government discipline a factory that is really a town?" The traditional solution was to maintain a strong Communist Party cell in every *danwei*, or work unit, in Chinese society. Each cell was responsible for carrying out government policies.

In 1985, the World Bank advocated instead that work units divest themselves of responsibility for social services. As a first step, the World Bank advocated that units sell off apartments to their tenants.[14] This was done on a very limited scale, for example, in the Number One Deshengli District in northwest Beijing. The Chinese press floated the idea that stores and restaurants should also be sold off, or at least turned over to their managers under long-term lease agreements, or *chengbao* contracts. *Chengbao* contracts are widely used only in the south. The idea of universal unemployment insurance was also broached in 1985, but not seriously pursued.

In the end, no consensus emerged on what to do about factory-run social services, and for a very good reason. These services are not provided by the state, but by an individual's *danwei*. The quality of services depends on a unit's resources. A *danwei* with many trucks, for example, can forage for luxury foods, consumer goods, and raw materials. The highways of China are jammed with factory trucks carrying Tianjin shrimp, television sets, and cement back to their units. The Chinese-American joint-venture boilermaker in Beijing, the Babcock & Wilcox Beijing Co. Ltd., sends its trucks all over China to secure steel plate. It is a "mad rush to get there first," an official explained to me on December 14, 1988. "Our drivers even had to sleep next to our steel plate at the Panzhihua Steel Mill to keep other drivers from stealing it."

In addition to trucks, a wealthy *danwei* might have its own buses, theaters, fish ponds, orchards, and even fishermen. For example, the Fiber Glass Factory near Badaling fails to turn out quality panels for passenger trains, but the workers eat fresh fish because the plant director allows them to spend a lot of time fishing at the Guanting Reservoir. Just as the availability of higher-quality food may depend on how many trucks a worker's *danwei* has, so too will the quality of housing depend on how many cement mixers and cranes a factory owns. None of these benefits are transferable. A 50-year old worker nearing retirement cannot transfer his pension to a new employer, even in the unlikely event that he changes jobs.[15] Therefore one's *danwei* matters far more than pay, at roughly $30–$50 per month, which is the same for everyone.

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[14] Edwin Lim, Chief of Mission, *China: Long-Term Development Issues and Options*, Baltimore: The Johns Hopkins University Press, 1985, p. 11.

[15] *Far Eastern Economic Review*, October 25, 1990, p. 18.

Next in importance to the *danwei* is the *xitong*, which literally means "system," but refers to all the work units under a single ministry or equivalent body at the State Council level. The *xitong* to which a person belongs can be a matter of life and death, because ministries generally run the big hospitals that are only open to staff within that *xitong*. For example, the Ministry of Energy Resources has excellent facilities for treating blood clots, as I learned when visiting a friend in its hospital. But if a worker in a factory under the Ministry of Railways were dying of a thrombosis, it would be impossible to receive treatment at the Energy Resources hospital, unless his spouse worked in the Energy Resources *xitong*.

Because these many services are not provided by the central government, but by units, in the final analysis China is not a socialist state but remains a collection of socialist units. Thus, it is hard to talk about socialism in China without asking the question, "Ni nar?"—which literally means "where are you?"—but really is a way of asking "what unit are you from?" It is the first question asked on the phone, since the response depends on the rank of the caller's *danwei*. It is also the first question asked at the front door of many hospitals. After a bicycle accident at Tiananmen Square on April 29, 1987, a man with a broken collar bone was rushed to the Union Medical College. He was turned away because he did not belong to any unit and was carrying no cash, and went home untreated. He was one of the growing legions of workers who have no *danwei* at all. Poor people enter hospitals in China clutching wads of cash. Street vendors and private entrepreneurs, too, are completely on their own. Even people in state factories have few benefits if they are contract workers. Since 1986 contract workers have no guarantee of lifetime employment.[16]

Clearly Chinese socialism would come tumbling down if factories concentrated only on production. Until a nation-wide net exists to catch the unemployed, sick, hungry, and uninsured, the state is reluctant to permit managers to fire workers. This makes it possible for managers to blame their unsatisfactory economic performance on poor labor discipline that results from guaranteed lifetime employment—the so-called "iron rice bowl."

IX. Rigid Work Rules

When asked, "who is to blame for the mess in state factories?" Chinese officials do not hesitate a second. The managers and workers have absolutely no *zerengan*, or sense of responsibility, they say, and that is why tools are stolen and raw materials are wasted. Deng Xiaoping's original "20 Points" that outlined China's reform policies placed great emphasis on stricter work rules.

Work rules make it easier to assess blame, the thinking goes. Hence the clearer the rules, the easier it is to point the finger and administer the fine. Other countries have work rules too, but normally in combination with higher pay for good work. Western managers generally prefer the carrot, but keep the stick handy. But in a Chinese state factory bonuses are normally the same for everyone regardless of performance. The iron rice bowl makes the stick more like a noodle. Out of frustration, the government has encouraged state factories to write up in detail each person's tasks, and levy fines accordingly. Behind the gatekeeper as one enters a Chinese factory there is usually a large poster saying who can enter the plant and under what conditions. The gatekeeper must enforce the rules, and likewise the machinery operator and the accountant must observe the regulations on the wall behind the machinery and on the wall of the office. Sometimes the regulations are painted in large red characters or chiselled in cement for everybody to see. The real message is "We mean it this time!" but in the absence of an enforcement mechanism, managers cannot do much.

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[16] *Far Eastern Economic Review*, October 25, 1990, p. 17.

Most work rules are based on fixed ratios, which reflects the idea that production relationships are fixed for all time. For example, when Chinese go on buying trips to Western factories they tend to ask strange questions about ratios: What is the ratio of supervisors to workers? Or quality control inspectors per plant? Or the ratio of inventory and production floor space? The Chinese are gathering information about the ratios in order to translate everything they see into precise work rules that can be followed by the most indolent worker. Otherwise they cannot be sure the equipment will work in China.

This nurtures technological rigidity, which is reflected on the shocked faces of foreign executives when they see their own equipment operating in China. Instead of the usual changes and improvements one expects to see five or ten years later, they see their equipment operating just as it did on the occasion when the Chinese visited and asked all those questions about ratios.

Nearly 50 years ago, the Ford Motor Co., for example, sold its jeep designs to the Russians during World War II, who later sold the designs to the Chinese. Years later, American Motors established a joint venture in China that happened to be at the same factory that made the old Ford. American's joint venture, later taken over by Chrysler, assembled the Cherokee Jeep. But the joint venture partners also agreed to keep producing the old Ford—now called the "212 Jeep." The Chinese resisted Chrysler's efforts to change the jeep's Russian-style production. After years of trying, Chrysler's chief engineer admitted to me on October 15, 1988, that only a few improvements in the old Ford had been made, including bucket seats in front, thicker canvas on the roof, doors for winter use, and a cigarette lighter in the dashboard. The Chinese fought even these changes. Why change manufacturing procedures, they wondered, and upset the work rules?

Such rigidity makes it hard for China to manufacture advanced products, except in the laboratory environment where innovation is possible. For example, the display cabinets in the reception rooms of state research institutes often contain copies of advanced Western products, like TID's high-speed 101 tape recorder. This proves that Chinese scientists and engineers are first rate, and can produce almost anything in their well-equipped laboratories. But when the brilliant engineering prototypes are turned over to state factories to be mass produced, quality plummets. For example, the Suzhou Aircraft Instruments Factory makes China's most advanced prototypes of cockpit instruments for jet fighters, but has failed to mass produce anything except simple parts for home refrigerators.

X. THE ROLE OF FOREIGN JOINT VENTURES

Foreign joint ventures in China, some officials hoped, would succeed where rigid work rules and everything else had failed by turning factories over to ruthless capitalists to administer shock treatment. Many state factories were indeed shocked when foreign companies finished their feasibility studies and said, "Yes, a joint venture is possible—in that little corner building, and 25 workers is plenty." The Yokogawa joint venture in Xian, for example, utilized a tiny slice of its partner's vast operations, and still produces a large volume of industrial control equipment.

In the end, foreign joint ventures probably received more shocks than they administered. Many were crippled by supply problems. The biggest headache for Mr. Yang Tong, the general manager of the Shanghai-Foxboro Co. Ltd., was supplies made in China. Supplies were delivered by the state, he noted on May 4, 1988, but the poor quality and delivery forced him to continue importing supplies. That raised costs and made it harder to win orders.

To the disappointment of the Chinese government, there were few joint ventures in the manufacturing sector and any remedial impact they may have had on management was correspondingly small. Most joint ventures were in hotels and export processing, and in other areas not dependent on the state supply system. In fact, total foreign investment in all of China in recent years has been less than total investment in Bangkok. Most investment is concentrated on the coast, where private and collective firms predominate. Two-thirds of China's entire foreign direct investment in 1988 was in Guangdong Province. It is only a slight exaggeration to say that foreign investors still prefer to locate their factories by a pier facing Hong Kong, which is very telling indeed in a country of China's vast land mass and diverse industrial base that has supposedly experienced ten years of reform.

XI. FACTORY AUTONOMY

A possible path to factory autonomy was outlined for me on July 9, 1988, by a State Planning Commission official, Xing Youqing. He said that beginning "soon" all enterprises outside the state plan would be turned over to private managers, who would sign long-term leases and pay rent to the government. After this system "had invigorated the economy making it safe to move ahead," state factories could adopt the same system, he said. Then, planners would step back and only engage in *choujian*, the colloquial word for macro planning. Finally, all enterprises would be allowed to freely issue, buy, and sell stocks. Complete privatization would take place as ministries sold off their stocks in what had once been state enterprises.

Factory autonomy was the most talked-about reform of all. Yet factory people will tell anyone who cares to listen that the reform never made it past the front gates. "We are called corporations, but we are not like your corporations," said an engineer from the Jilin Chemical Industry Corporation. The Director General of the Foreign Investment Administration, Liu Yimin, admitted on June 27, 1988, that "state enterprises will have to make money one day, or they will be abolished. But right now they are not legal persons and basically have little responsibility."

Zhao Ziyang himself, the former Party General Secretary now under house arrest, said that factory autonomy "had not really been carried out." In his January 23, 1988 interview in the *Guangming Daily*, he warned that "efforts to improve large and medium state enterprises will be wasted unless we adopt a system that works." This was a significant admission, since Zhao played a major role in formulating both the October 20, 1984 "Decision of the Central Committee on Reform of the Economic Structure" that launched urban industrial reforms, as well as the State Enterprise Reform Law that passed the last session of the National People's Congress on April 13, 1988.

Factory autonomy was thwarted mainly by the power of city governments and their subordinate bureaus and corporations. For example, the man who once ran the Wuhan Instrumentation Industrial Co. from his office in the Bureau of Instrumentation Industry in Beijing complained on February 25, 1988, that the factory no longer even sends him reports. Now the factory gets money from the Wuhan bureau of industry, and takes orders from the Wuhan government, not Beijing.

Not surprisingly, cities and provinces squeeze factories for as much cash as possible. In the late 1980s, I was frequently approached by decentralized state factories that were desperate for money. The city of Qingdao, one factory complained, had cut off loans and told it to find a foreign investor willing to refurbish its plant and equipment. The Qingdao Pressure Gauge Factory sent this appeal for help: "Dear Sir: Our factory was established in 1966, and covers 7,914 square meters of which 7,084 is factory space. We have 380 workers, of which 28 are technicians. Our annual output is 300,000 pressure gauges. Using the form of joint venture management, with our side providing plant, equipment, and labor, and your side providing the equipment, know-how and cash, we propose selling abroad using your company's access to foreign markets." [17] Nothing came of their letter.

But cities and provinces fight tenaciously when it comes to protecting the markets of their factories. For example, Liaoning Province nearly stopped the No. 47 Research Institute in Beijing (under the Ministry of Aeronautics and Astronautics) from selling its control software to the Liaoning Power Plant (under the Ministry of Energy Resources). Making the sale was like "crossing the Great Wall," I was told on August 1, 1988, because the customer was under a different ministry, and even worse, in a different province. Foreign companies are terribly disillusioned when they set up a factory to serve all of China, then discover that their market is limited to regions where they enjoy political support. For example, during one joint venture negotiation, the foreign side asked about a marketing plan. The Chinese side said, "the provincial bureau chief once worked in this factory, so don't worry." Later the bureau chief showed his face at a banquet. That was proof enough, the Chinese believed, that the joint venture's market would be protected in that province, and a marketing plan was unnecessary.

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[17] June 2, 1989, letter from the Deputy Director of the Qingdao Pressure Gauge Factory, 25 Yichang Road, Qingdao, Shandong Province.

Such intense regionalism compels factories to be very self-reliant, and they are. When the Sichuan Instrument Plant needs mechanical or electrical parts, for example, it assigns the task to factories 1, 3, 6, or 13, which employ hundreds of workers making parts used in the plant's other 16 factories. The Sichuan Plant never thinks of giving the job to an outside factory. The reasons are interesting: outside factories are considered unreliable and sloppy, and when it is time to deliver the goods, outside factories will demand that the buyer's trucks come and pick up the goods and bear the risk of damage during shipment.

Curiously, factories in other regions have exactly the same complaints about the Sichuan Instrument Plant. For example, the Wuhan Iron and Steel Corporation gets such bad service from the Sichuan Instrument Plant, and other domestic suppliers, that it has built its own instruments factory, called the Iron and Steel Instrument and Meter Plant. Its vice director, Yu Chuanwen, admitted on January 27, 1989, that it was a waste to make instruments themselves, "but we have no choice." Likewise, the Fushun No. 2 Refinery told me that the Sichuan Instrument Plant's products are "always late." So are their other suppliers, hence they still make instruments themselves. "We were told to stop being self-sufficient by 1988," a plant official said in mid-1988, "but we couldn't change because the system hasn't changed."

XII. CONCLUSION

Following a decade of reforms, China enters the 1990s with its key industries surviving virtually unchanged under the equally unchanged leadership of men like Chen Yun, the 85-year-old patriarch of central planning.

The central government's dependence on the income from state enterprises creates a crippling fear of innovation. Rather than encourage private and collective enterprises, whose revenues go to cities and provinces, the central government reserves its best engineers, scarce foreign currency, and key materials for state factories. These factories cling to the obsolete ideal of the self-sufficient factory that produces everything it needs while providing its workers with education, health care, entertainment, and even fresh fish. In the absence of an alternative safety net, these services cannot be divorced from the state factories: what could China do with the unemployed millions who would be dismissed from their jobs as bakers, teachers, and drivers at state factories?

A major obstacle to reform of state factories is the planning system itself. In 1985, the World Bank suggested that planners guide the economy by indirect means, using monetary policies, for example.[18] But it became obvious in 1989 that China neglected this advice. Inflation hit the double-digit zone, and Beijing panicked.

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[18] World Bank, *Long-Term Development Issues*, p. 14; and United Nations Development Program (UNDP) contract with the China International Center for Economic and Technological Exchange, signed in 1989, p. 28.

Planners grabbed the brakes and cut off credit to everybody. Banks were ordered to approve nothing.

The rate of inflation did decline, but the economy was almost paralyzed. State factories could not pay their bills, and many private and collective industries reportedly went out of business. Instead of tightening credit, Beijing eliminated credit. Had the planners followed the World Bank's advice and employed indirect policies, the banking system could have continued to extend loans to strong enterprises that were capable of paying higher interest rates. This would have helped the planners distinguish between profitable and unprofitable enterprises, something they have professed to want for the past ten years.

Instead Beijing cut off the money supply, waited a few weeks to see who screamed the loudest, and then slowly relaxed its grip, giving first priority to factories with the greatest political clout—not those that were necessarily profitable. When credit was eased, the government's first rescue package for the equivalent of U.S. $1.7 billion was given to a preferred list of large-scale state enterprises.[19] Is it any wonder that China's state enterprises don't change?

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[19] *The New York Times*, March 8, 1990, p. 1.

MODERNIZING CHINA'S TRANSPORT SYSTEM

By Ralph W. Huenemann *

CONTENTS

Page
I. Summary Introduction: The Transport Bottleneck 455
II. The 1980s: A Decade of Expansion and Upgrading 456
  A. Railways 456
  B. Highways 461
  C. Water Transport 465
  D. Pipelines 466
  E. Civil Aviation 468

I. SUMMARY INTRODUCTION: THE TRANSPORT BOTTLENECK

In the 1972 volume in this series, P. Vetterling and J. Wagy surveyed China's transport system over the period from 1950 to 1971 and characterized it as "generally adequate to meet the demands of the economy, with only infrequent instances of congestion of a local or seasonal nature." [1] Unfortunately, this optimistic assessment was soon out of date. When it was announced at the famous Third Plenum in December 1978 that the growth targets proclaimed just a few months earlier were being abandoned as overly ambitious, energy shortages were cited as a key reason for the policy change.[2] In the Chinese economy, where coal is the prime source of energy, energy shortages are closely linked to transport bottlenecks. Thus, a transport system that was "generally adequate" in the early 1970s had become a major problem area by the end of the decade. Inadequate transport capacity has remained a serious constraint ever since, often being identified (along with energy) as a "key bottleneck" or a "prominent weak link" in the economy.[3]

These qualitative impressions are reflected in the quantitative record, as shown in Table 1. During the rapid economic growth period of 1952–59, when the gross value of industrial and agricul-

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[1] Philip W. Vetterling and James J. Wagy, "China: The Transportation Sector, 1950–71" in Joint Economic Committee, 92nd Congress, 2nd Session, *People's Republic of China: An Economic Assessment*, Washington, D.C.: Government Printing Office, 1972, p. 150.

[2] Hua Guofeng, "Report on the Work of the Government," *Beijing Review*, July 6, 1979, pp. 5–31.

[3] See "Go All Out to Improve Railway Transport," *Beijing Review*, February 25, 1977, p. 3; Zhao Ziyang, "The Current Economic Situation and the Reform of the Economic Structure," *Beijing Review*, April 22, 1985, p. iv; Wang Yuanzhi, "Tantan jiaotong yunshu touzi qingxie de ruogan wenti (A discussion of several questions concerning the emphasis in communications and transport investment), *Touzi Yanjiu* (Investment Research), June 1989, p. 30; and "Decision on Further Improving the Economic Environment, Straightening Out the Economic Order, and Deepening the Reforms (Excerpts)," *Beijing Review*, February 12, 1990, p. vii.

tural output (GVIAO) grew about 15% a year on average, freight traffic and passenger traffic (on mechanized modes) grew by 23% and 16% respectively, suggesting that the income elasticity of demand for modern transport is greater than 1.0. The experience of 1959–65, when China's economy suffered great distress, is shown in Table 1 for completeness but tells us little about more normal circumstances. During the period of 1965–78, when GVIAO grew by 8.5% a year despite the adverse effects of the Cultural Revolution, freight traffic grew at 8.4% and passenger traffic grew at 7.3%—both somewhat slower than would have been predicted from the income elasticities observed in the 1950s. Not surprisingly, this was a period when complaints about transport bottlenecks became more frequent. Finally, in the period of the economic reforms since the Third Plenum, GVIAO has grown at about 11% a year, while freight and passenger traffic have grown at about 9% and 12% respectively. Despite this rapid growth of passenger traffic, which was achieved only by severe overcrowding on trains and buses, many would-be travellers could not buy tickets. At the same time, however, the expansion of passenger traffic that did occur made the freight bottleneck just so much worse, especially on trunk routes. In this context, the continuing complaints about transport as a weak link in the economy are not surprising, but it is important to remember that the complaints arise, not because transport has been stagnant, but because the transport sector has been scrambling—with only partial success—to keep up with the demands of a rapidly growing economy.

TABLE 1. Growth Rates of Economy and of Modern Transport

[average * per annum]

Time Period	Real GVIAO [2]	Modern Ton-Km	Modern Passenger-Km
1952–59	14.9	23.1	16.3
1959–65	0.2	1.0	−0.4
1965–78	8.5	8.4	7.3
1978–89	10.9	9.1	12.0

[1] Traditional transport remains important in the Chinese economy, but mainly for short trips, so these traditional modes contribute relatively little to total ton-km and passenger-km.

[2] Real GVIAO is the gross value of industrial and agricultural output, measured in constant prices.

II. The 1980s: A Decade of Expansion and Upgrading

A. RAILWAYS

Network: In 1949, China had a railway network of only about 21,800 kilometers, and large areas of the country had no rail lines at all. For the next three decades, the government worked vigorously to extend the network, with new routes being opened at the average rate of 1,000 km a year between 1952 and 1979 (see Table 2). Substantial investment went to the upgrading of existing routes (such as the double tracking of the Tianjin-Pukou line), but the main focus was on new routes, especially in the frontier regions of the northwest and southwest, where population is sparse and the terrain extremely inhospitable to railways.

In the arid northwest, where the Baotou-Lanzhou and Lanzhou-Urumqi lines were completed in the late 1950s and early 1960s, the key engineering problem was to stabilize shifting sand dunes. In the mountainous southwest, the problems were even more daunting. For example, the Chengdu-Kunming line, completed in 1970, contains over 400 km of bridges and tunnels in its 1,085 km length. Vetterling and Wagy call it "one of the great engineering feats of the modern world." [4] Other lines in the region—such as the Baoji-Chengdu (1958), Chongqing-Guiyang (1965), Guiyang-Kunming (1966), Yangpingguan-Ankang (1972), and Zhuzhou-Guiyang (1972)—also traverse difficult terrain. In a 1979 interview, the Minister of Railways suggested that the most difficult new route of all was perhaps the Xiangfan-Chongqing (1978), which runs over bridges or through tunnels for 45% of its 901 km.[5] And it might be argued that an even more difficult engineering challenge is the Xining-Lhasa line, which was carried as far as Golmud by 1980 and then—sensibly—postponed indefinitely.

Toward the end of the 1970s, a major shift in railway policy occurred. One indication of the shift came at a national railway conference in April 1978, when the Minister stressed the need to upgrade existing routes.[6] Other authoritative statements of the period reinforced the message that, while China would continue to build some new lines, priority would be given to modernizing the existing lines in heavy-traffic corridors.[7] As can be seen from the data on route length in Table 2, this shift in priorities persisted right through the 1980s, with only about 350 km of new routes being opened per year on average. Furthermore, the new routes of the 1980s were mostly prosaic heavy-haul coal lines radiating from Shanxi province toward the industrial areas on the east coast, not heroic nation-building links to the frontier regions. One of the few exceptions to this pattern in the 1980s was the 460-km line from Urumqi to Alataw on the Soviet border, which was officially opened on September 1, 1990.[8] Of course, by the late 1970s, many of the earlier gaps in the network had been filled in, so it was natural to de-emphasize new construction to some extent. But this tendency was probably reinforced by the economic reforms after the Third Plenum, which encouraged greater attention to the rate of return on investment.[9]

To increase carrying capacity on existing single-track routes, 50 kg/m rail has largely replaced the earlier 43 kg/m standard, and some corridors are being provided with 60 kg/m rail. Also, the

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[4] Vetterling and Wagy, p. 153.

[5] "Building Up China's Rail Transport," *China Reconstructs*, October 1979, p. 76.

[6] "China's Railway Minister on Modernizing Faster," *Economic Reporter*, April-June 1978, p. 29.

[7] Wang Peixian, "Railway Development: Moving on a Faster Track," *China Business Review*, January-February 1982, p. 32.

[8] "New Railway Spans Asia, Europe," *Beijing Review*, September 17, 1990, p. 10.

[9] See for example Cao Yaolin and Wang Yongyin, "Tigao woguo tielu jianshe de jingji xiaoyi" (Increasing the economic effectiveness of China's railway construction), *Jingji Yanjiu* (Economic Research), December 1982, p. 49, where it is argued that on eight long-established heavy-traffic lines each 10,000 RMB spent on upgrading enabled an extra 307,000 ton-km of traffic to be carried per year on average, while for fourteen recently-constructed new lines each 10,000 RMB of investment generated only 76,000 tonkm of traffic per year on average.

TABLE 2. Growth of the Railway Subsector, 1952–89 [11]

Year	Route [2] Length (000 km)	Freight Traffic (million tons)	Freight Turnover (billion ton-km)	Passenger Traffic (million)	Passenger Turnover (billion pass-km)
1952	22.9	132.2	60.2	163.5	20.1
1957	26.6	274.2	134.6	312.6	36.1
1965	36.4	491.0	269.9	412.5	47.9
1978	48.6	1101.2	534.5	814.9	109.3
1979	49.8	1118.9	559.9	863.9	121.6
1980	49.9	1112.8	571.7	921.2	138.3
1981	50.2	1076.7	571.2	952.2	147.3
1982	50.5	1135.0	612.0	999.2	157.5
1983	51.6	1187.8	664.7	1060.4	177.7
1984	51.7	1240.7	724.8	1133.5	204.6
1985	52.1	1307.1	812.6	1121.1	241.6
1986	52.5	1356.4	876.5	1085.8	258.7
1987	52.6	1406.5	947.1	1124.8	284.3
1988	52.8	1449.5	987.8	1226.5	326.0
1989	53.2	1514.9	1039.4	1138.1	303.7

[1] Data for 1952–88 from *Zhongguo Tongji Nianjian 1989* (1989 Statistical Yearbook of China); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990).

[2] Includes central and local standard gauge lines (and the metric lines near Vietnam) but not the light railways used in forestry and mining.

standard siding length on many routes is being increased from 850 m to 1050 m. These measures permit longer, heavier trains, but by themselves are inadequate in major corridors. On the latter routes, electrification (25 kV) or double tracking, or both, are being extended. By 1989, about 25% of the rail network had been double tracked and over 10% had been electrified.

Recently announced projects for the Eighth Five-Year Plan (1991–1995) suggest that extending the railway network over new routes will receive more attention in the 1990s than in the 1980s. Some of the routes proposed are in mountainous frontier regions (such as the Chengdu-Daxian, Xi'an-Ankang, and Nanning-Kunming lines), but the primary expenditure seems destined for two new north-south routes (Beijing-Jiujiang and Beijing-Kowloon) as well as for expanded capacity on the vital Datong-Qinhuangdao and Shenyang-Qinhuangdao corridors.[10]

Fleet: As every railway romantic in the world surely knows, China still operates several thousand steam locomotives. However, the days of steam are numbered, and already nearly half of the locomotive fleet (46% in 1989) is non-steam. The last of the Qianjin 2-10-2's was built at Datong in December 1988; all future additions to the fleet will be diesel or electric. In 1980, China produced about 130 diesels (some diesel-electric and some diesel-hydraulic) and about 40 pure electrics.[11] Domestic production of locomotives has expanded through the 1980s as key factories have been modernized, and Chinese sources indicate that output will be about 630 diesels and 200 electrics in 1990, rising further to 700 diesels and 350 electrics in 1995.[12] Substantial numbers of locomotives have also been imported, including 50 French diesel-electrics, 34 West German diesel-hydraulics, and a significant number of Romanian diesel-electrics in the 1970s, followed by 420 American diesel-electrics in the 1980s. Pure electrics have been imported from France, East Germany, and Czechoslovakia.[13] Even including the imports, however, China's locomotive fleet has been growing by only about 3% a year over the past decade (reaching 13,524 units in 1988).[14]

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[10] "More Railways for the 1991-95 Period," *Beijing Review,* September 24, 1990, pp. 10–11.

[11] Wang Peixian, p. 33.

[12] Gong Wei, "China's Railway Rolling Stock Industry Development Strategy," *China Market,* July 1989, p. 11.

Where freight cars and passenger coaches are concerned, the situation is similar to that for locomotives. The quantity and quality of domestic production is improving, as factories are modernized and expanded, and this domestic output has been supplemented by some imports of specialized equipment. In 1980, China produced about 1,000 passenger coaches and 10,500 freight cars.[15] By 1990, production has risen to about 2,800 passenger coaches and 26,000 freight cars.[16] Some of this output merely replaces older cars being retired; the net addition to the fleet is correspondingly less. In net terms, the freight car fleet has grown only about 3% per annum over the past decade (reaching 340,299 units in 1988), and the passenger coach fleet only about 6% (24,917 units in 1988).

Traffic and Operations: Historically, the modernization of transport in China has been synonymous with the building of railways. In recent years, however, the modal split has gradually become more diversified, as highways, shipping, airlines and pipelines have been developed. Also, non-mechanized transport continues to play an important role, though only for short-haul traffic. Since the Third Plenum, the rail share of measured freight turnover in the modern sector (excluding ocean shipping) has fallen from 73% in 1978 to 59% by 1988. For passenger turnover, the rail share has fallen from 63% to 53%.[17] These trends will undoubtedly continue. Despite these declining shares, however, the absolute level of traffic on the railways rose dramatically over the same period and put severe pressure on the system's capacity. Since 1978, the ton-km carried by rail have increased by 6% a year—twice the growth rate of the freight car fleet. Similarly, the passenger-km carried by rail have increased by nearly 10% a year—as against the 6% annual increase of coaches in service.

This performance was achieved by the intensified utilization of equipment and track that were already heavily utilized. Inevitably, there have been some adverse consequences. The most pervasive is poor service. On the passenger side, severe overcrowding has become the norm, even though many would-be passengers are turned away for lack of space. The standard hard-seat carriage, designed to hold 108 people, is often packed with as many as 236 passengers, and the Ministry of Railways has even resorted to using converted boxcars to carry passengers at peak periods.[18]

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[13] This account of imports may not be complete. See Peter Clark, *Locomotives in China*, Waterloo, N.S.W.: Roundhouse Press, 1983; Joachim Petersen, *Die Eisenbahn in China*, Stuttgart: Motorbuch Verlag, 1983; Huang Zhihe, "Tantan woguo tielu qianyin dongli de xianzhuang he fazhan" (A discussion of China's railway tractive power, present and future), *Tiedao Zhishi* (Railway Knowledge), May 1987, pp. 2–3; Wang Yanping, "Locomotives Running Out of Steam," *China Daily Business Weekly*, June 28, 1987, p. 2; and Thawat Watanatada, Clell Harral and Pam Baldinger, "Railways," *China Business Review*, March–April 1989, pp. 14–19.

[14] Basic data on railway fleet size can be found in the various issues of *Zhongguo Tongji Nianjian* (Statistical Yearbook of China) .

[15] Wang Peixian, p. 33.

[16] Gong Wei, p. 11.

[17] The actual rail share is almost certainly less than these measured amounts, because data on rail traffic are reasonably accurate, while substantial highway traffic goes unrecorded.

The discomfort and inconvenience of this situation have been exacerbated by a rising crime wave. Commercial travellers who go to the coastal regions to obtain consumer goods for inland markets often carry large sums of cash, and theft on trains has become a serious problem. The illegal resale of tickets by scalpers is another element in the crime wave. On the freight side of the picture, volume and axle-load limitations constrain the temptation to overload, but the resulting severe rationing of capacity means that shippers often find their requests for cars delayed or denied. The temptation to offer—and accept—bribes is obvious. In 1989, 224 major embezzlement and bribery cases involving the railway system were handled by the courts. The bribery problem came to a head in early 1990, when a Vice Minister named Luo Yunguang was fired for taking bribes and for failing to discipline subordinates who also took bribes.[19]

Another adverse consequence of intensive utilization is that safety margins are compressed. On March 24, 1988, two passenger trains collided near Shanghai, killing 28 people (most of whom were Japanese visitors). This was the fourth serious railway crash in the space of four months, and it forced the resignation of the Minister of Railways, Ding Guanglen.[20]

Fundamentally, there are only two solutions to the congestion problem: to add capacity, or to deflect demand. Both are being pursued. The efforts to increase capacity by increasing the length and frequency of trains (longer sidings, greater tractive power, double tracking, etc.) have already been mentioned. On relatively light traffic routes, the further diffusion of existing technology would be quite adequate, so the problem is essentially one of financing the necessary investment. Given the limitations of the central government's budget, an alternative that has received increasing attention recently is the building of local railways by provincial authorities. These should not be confused with the narrow-gauge railways that have long been used in mining and forestry work in various parts of China.[21] The new local railways are built to standard gauge and will share rolling stock with the national pool. Of the 10,000 km of new rail lines planned for construction in the 1990s, about half are expected to be local railways.[22]

On heavy-traffic routes, however, current Chinese railway technology is being pressed to its limits; further expansion of traffic will require a new generation of high-tech equipment, utilizing modern electronics for signalling, marshalling, and other tasks.

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[18] "Passenger Trains Overloaded," *Beijing Review*, July 25, 1988, pp. 11-12.

[19] "Police Fight Crimes on Trains," *Beijing Review*, October 17, 1988, pp. 12-13; Yi Hong, "China's Railways: Getting on Track," *China Reconstructs*, October 1988, pp. 13-15; "Vice-Minister Sacked in Scandal," *Beijing Review*, March 26, 1990, p. 13; Ben Chi, "Gains and Losses of China's Railway Construction," *China Market*, May 1990, pp. 13-15.

[20] Yi Hong, p. 13.

[21] Rudi Volti, *Technology, Politics and Society in China*, Boulder, Colorado: Westview Press, 1982, pp. 184-85; "New Advances in Transport," *Beijing Review*, February 15, 1974, p. 22.

[22] Watanatada, Harral and Baldinger, p. 15; Yang Yuying and Lu Baogui, "Ji-Tong tielu" (The Jining-Tongliao railway), *Tiedao Zhishi* (Railway Knowledge), January 1990, pp. 8-9; Cui Jinlai, Bai Jianhong, and Wang Minxuan, "Henan sheng difang tielu" (Local railways in Henan province), *Tiedao* Zhishi, February 1990, pp. 1011; Wang Mingkui, "Kun-Yu tielu" (The Kunming-Yuxi railway), *Tiedao Zhishi*, March 1990, pp. 10-11.

Here the problem is not merely a capital budget constraint (though the necessary investments in computers and telecommunications will certainly be expensive) but some fundamental and rather intractable issues in systems design and technology transfer. To date, the Chinese have carried out extensive investigations of computerized railway operations in other countries but appear not to have made any final decisions about the configuration of their own system.

The other solution to overcrowding is to shed demand. In a centrally planned economy, the traditional answer to excess demand is to ration supply—either by applying a "first come, first served" rule (more common on the passenger side) or by allocating scarce space to favored shippers (more common on the freight side). Both methods cause frustration and resentment. An obvious alternative is to curtail demand by raising fares, but China's leaders have been extremely cautious about doing this, since inflation is also unpopular.

Over a period of three decades, railway freight rates were changed only once (in 1967)—at which time they were reduced, not increased. Finally, rail charges were increased in steps in 1983, 1985, 1989 and 1990. As can be seen from Table 2, these price increases appear to have caused some decline in passenger traffic in 1989, but overcrowding continues to be a serious problem.[23]

B. HIGHWAYS

Network: In many respects, the phases of development of China's highway network have paralleled the pattern for railways. In 1949, large areas of the country had no highways at all, so the first phase—quite naturally—was one of rapid expansion of the network. As can be seen from the data in Table 3, the highway system expanded from 127,000 km in 1952 to 515,000 km in 1965, for an average growth rate of nearly 11% a year. Most of these new roads were of low quality, however, since funding was being stretched to the limit. This first phase witnessed the construction of many frontier highways, with nation-building and strategic purposes receiving greater attention than economic calculations. Examples include the Chengdu-Lhasa, Xining-Lhasa, and Yecheng Burang roads into Tibet (built in the 1950s), and the roads built with Laos, Nepal, and Pakistan in the 1960s. Like the railways built in this same southwestern quadrant of China, these highways often posed daunting engineering challenges. The 1,455-km Yecheng–Burang road, for example, has an average elevation of 4,200 meters—making it the highest road in the world.[24]

In 1965–1978, the expansion of the highway network decreased dramatically, to about 4% a year. In part, this slowdown reflected the policies of the Cultural Revolution, which aimed to reduce economic transactions between regions. The emphasis on local

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[23] Tomoyuki Uchida, "Problems in Transportation in Development of Pingsu Coal Mines in Shanxi," *JETRO China Newsletter,* No. 70, September–October 1987, p. 9; Watanatada, Harral, and Baldinger, P. 15; "China Will Execute Unified Price of Coal Transport in 1989,11 *China Market,* April 1989, p. 52; Xiao Zhu, "China to Raise Railway Freight," *China Market,* July 1989, pp. 16–17.

[24] "China Facts and Figures: Communications and Transport," Beijing: Foreign Languages Press, 1982, p. 2; Vetterling and Wagy, pp. 161–63.

TABLE 3. Growth of the Highway Subsector, 1952–89

Year	Route Length (000 km)	Freight [2] Traffic (million tons)	Freight Turnover (billion ton-km)	Passenger Traffic (million)	Passenger Turnover (billion pass-km)
1952	126.7	131.6	1.4	45.6	2.3
1957	254.6	375.1	4.8	237.7	8.8
1965	514.5	489.9	9.5	436.9	16.8
1978	890.2	851.8	27.4	1492.3	52.1
1979	875.8	3710.4	74.5	1786.2	60.3
1980	888.3	3820.5	76.4	2228.0	72.9
1981	897.5	3636.6	78.0	2615.6	83.9
1982	907.0	3792.1	94.9	3006.1	96.4
1983	915.1	4014.1	108.4	3369.7	110.6
1984	926.7	5333.8	153.6	3903.4	133.7
1985	942.4	5380.6	169.3	4764.9	172.5
1986	962.8	6201.1	211.8	5442.6	198.2
1987	982.2	7114.2	266.0	5936.8	219.0
1988	995.6	7323.2	322.0	6504.7	252.8
1989	1014.3	7258.3	333.0	6424.1	264.0

[1] Data for 1952–88 from *Zhongguo Tongji Nianjian 1989* (1989 Statistical Yearbook of China); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990).

[1] Freight data through 1978 are only for state-owned vehicles.

self-reliance in this period was epitomized by the exhortation to curtail the "irrational" exchange of grain from south to north and coal from north to south.

In the period since 1978, the expansion of the highway network has slowed even further, to a mere 1% a year. This does not reflect an intensification of the policy of local self-reliance, however. Rather, the highway investments of recent years—which have been substantial—have been concentrated on the upgrading of existing routes in heavy-traffic regions. While unsurfaced dirt roads constituted 39% of the network in 1979, this fraction had been reduced to 17% by 1988.[25] Much of this surfacing is still done with inadequate materials (mixed bitumen, sand, and gravel), requiring high maintenance, but the average quality—and hence traffic capacity—of China's highways has definitely been improving in recent years. In a few locations, highways that can accurately be called expressways are being built, including the Shenzhen-Guangzhou-Zhuhai, Beijing-Tianjin-Tanggu, and Shenyang-Dalian projects.[26] However, superhighways of this sort, while undoubtedly very useful on heavy-traffic routes, carry a price tag of between 6 and 12 million RMB per kilometer and therefore have only limited applicability in China.

Fleet: Production of motor vehicles in China began in 1956, when the No. 1 Vehicle Factory in Changchun turned out the first "Liberation" 4½-ton trucks, modeled on the Soviet ZIL–150 that was in turn a copy of a pre-war Ford.[27] Other major production facilities that have come on-stream over the years include those in Beijing

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[25] Volti, p. 191; Chen Yuanhua, "Highways," *China Business Review*, March–April 1989, p. 28.

[26] Chen Yuanhua, p. 30; *Beijing Review*, September 3, 1990, p. 9.

[27] Volti, p. 194; Vetterling and Wagy, p. 163; Albert S. Peterson, "China: Transportation Developments, 1971–1980, " Joint Economic Committee, 97th Congress, 2nd Session, *China under the Four Modernizations, Part* 1, Washington, D.C.: Government Printing Office, 1982, p. 152.

(jeeps), Shanghai (sedans), Jinan (8-ton trucks), and Nanjing ("Leap Forward" trucks). Particularly important is the No. 2 Vehicle Factory, which—as a model of Maoist regional self-reliance—was deliberately located in the remote village of Shiyan in Hubei province.[28] The No. 2 Factory began serial production in 1975. Although China now has more than 100 vehicle production or assembly plants, located in all provinces (except perhaps Tibet), and although these factories produce a wide variety of vehicle types and sizes, the No. 1 and No. 2 factories dominate the industry. For example, in 1986 the No. 1 produced about 85,000 vehicles and the No. 2 about 95,000, which together amounted to 49% of that year's national output of 370,000 cars, trucks, and buses.[29] Because the "Liberation" truck produced in Changchun and the "East Wind" truck produced in Shiyan are very similar in size and function, China's truck fleet has suffered from a lack of diversity—in particular, a shortage of smaller vehicles to serve the needs of rural modernization. The result has been that agricultural tractors, especially the small two-wheel type, are widely used for transport purposes, which causes congestion and wastes fuel.[30] Over the years, China has imported a significant number of vehicles to supplement the domestic fleet, especially specialized vehicles like off-road dump trucks for the mining industry and deluxe sedans for the tourism industry and for high-level cadres. With some fluctuation from year to year, imports averaged about 10,000 vehicles per year in the 1950s, fell to about 5,000 per year in the 1960s, and then began a steady climb in the 1970s, from about 10,000 in 1970 to at least 25,000 in 1979.[31] Because of the economic retrenchment of the early 1980s, vehicle demand was temporarily flat, but then the success of the economic reforms brought about an explosion of demand. In 1984, although domestic vehicle production rose to 316,000 units from the previous year's 240,000, local supply could not begin to meet demand, and imports shot up to 149,000 from the 1983 figure of 25,000. Then, in 1985, despite domestic production of 437,000 units, imports ballooned to 354,000 units. Many of these imports came into China through Hainan Island, where a major corruption scandal was brewing.[32] Despite the ensuing crackdown, vehicle imports in 1986 numbered about 150,000, and have averaged about 90,000 units per year since then.

Predictably, this surge of imports has been greeted by a protectionist reaction from China's vehicle producers.[33] One policy response has been to increase tariffs and other taxes on imported vehicles to very high levels, so that a Volkswagen Santana that would sell for about $10,000 in the U.S. has a retail price of $43,000 or more in China.[34] Another policy response has been to encourage the transfer of technology to domestic factories by permitting them to form joint ventures with foreign partners, in the hope that this will accelerate import substitution. The best known of these agreements is certainly the one between American Motors Corporation and the Beijing Auto Works to form the Beijing Jeep Company (signed in 1983), but other important examples include the Volkswagen ventures in Shanghai (Santana) and Changchun (Audi 100) , Peugeot in Guangzhou, Citroen in Wuhan, Iveco (Fiat) in Nanjing, and Steyr with a consortium of heavy-duty truck factories led by the Jinan truck plant.[35]

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[28] Masaharu Hishida, "A Visit to China's 'Second' Automobile Factory," *JETRO China Newsletter*, No. 71, November-December 1987, pp. 2-8.

[29] *Beijing Review*, February 9, 1987, p. 10; Hishida, p. 5.

[30] It is estimated that a two-wheel tractor uses three-fourths as much fuel as a 4-ton truck, while pulling a maximum cargo of perhaps one ton. See Jacques Yenny, "Modernizing China's Transport System," *China Business Review*, July-August 1986, p. 21. Of course, the larger vehicles ensnared in the congestion also use extra fuel.

[31] The vehicle import data, taken from the *Statistical Yearbooks* are for trucks only. For early years, virtually all imports were trucks, but by the late 1970s other vehicle types were becoming important as well.

[32] Martin Weil, "Overhauling the Automotive Industry," *China Business Review*, July-August 1986, p. 28; Jim Mann, *Beijing Jeep*, New York: Simon and Schuster, 1989, p. 152.

[33] See, for example, "Auto Makers Urge Import Curb," *Beijing Review*, October 17, 1988, p. 10.

TABLE 4. Production and Imports of Motor Vehicles

Year	Domestic Production (000)	Imports [2] (000)
1952	—	1.8
1957	7.9	1.6
1965	40.5	6.2
1978	149.1	21.9
1979	185.7	24.8
1980	222.3	22.0
1981	175.6	9.9
1982	196.3	16.1
1983	239.8	25.2
1984	316.4	148.7
1985	437.2	354.0
1986	369.8	150.1
1987	471.8	90.2
1988	664.7	94.7
1989	573.7	85.8

[1] Data for 1952–88 from various issues of *Zhonggguo Tongji Nianjian* (Statistical Yearbook of China); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990). Includes cars, trucks, buses and some specialized vehicles, but not tractors or motorcycles.

[2] Import data through 1981 are for trucks only.

These automotive joint ventures have had serious problems. In most cases, the basic business plan has been to begin by assembling imported CKD ("complete knock-down") kits and then gradually to substitute local items for the components of the kits, until production becomes largely domesticized. An important additional element in the business plan, though apparently only tacit in many of the agreements, has been the hope that the joint venture would not be a drain on China's foreign exchange earnings, either because it would save hard currency by displacing imports or—preferably—would earn hard currency by exporting. In the event, these plans have proven to be unduly optimistic, because local suppliers of components have had difficulty meeting the quality and price requirements of the world market. As imports of components run at higher than projected levels, while exports of vehicles fall short of projections, the joint ventures are caught in a nasty foreign exchange scissors. For Beijing Jeep, this problem was solved by a secret agreement, signed in the spring of 1986, under which the Chinese authorities in effect made the RMB convertible for this one company (up to a limit of $120 million). This led to what Jim Mann has characterized as the "ultimate irony:" Beijing Jeep earned hard currency by selling an existing Chinese product (the old BJ212 jeep) to Chinese customers for RMB.[36]

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[34] Kim Woodard, "The Automotive Sector," *China Business Review*, March–April 1989, p. 39.

[35] The literature on these joint ventures is extensive. Mann's book on Beijing Jeep, already cited, is particularly detailed, but see also "How Volkswagen Performs in China," *Beijing Review*, July 21, 1986, pp. 24–25; Weil, pp. 28–35; Woodard, pp. 38–43; and a series of articles on the heavy-duty vehicle industry in the August 1989 issue of *China Market*.

Traffic and Operations: The official data on highway traffic, as given in Table 3, must be treated with caution. The data through 1978 measure only the traffic on "public" vehicles (those operated by the Ministry of Communications through its local bureaus). In principle, the data from 1979 onward include the traffic of own-account vehicles operated by factories, collectives, and individuals (which the Chinese refer to collectively as "social" vehicles), but this information is almost certainly incomplete.

Despite the imperfections of the data, certain characteristics of highway traffic in China are indisputable. The congestion of mixed traffic is a constant headache throughout the country, but it has not prevented an explosive growth of freight and passenger turnover. Since the Third Plenum, both ton-km and passenger-km on the highways have increased at about 16% a year on average (according to the official data), as compared to the 6% annual freight growth and 10% passenger growth on the railways. Quite likely, the true growth rates of highway traffic were even faster.

In some instances, the traffic moving on the highways would have been better served by rail, if rail capacity were available. This is undoubtedly true of the coal trucks from Shanxi province that one sees on the streets of Beijing, for example. For the most part, however, the shift of modal shares from rail to road that has been so evident over the 1980s represents a predictable and appropriate adjustment to the changing sectoral structure of the economy. The railways are simply not so well suited as trucks to handling the diverse, short-haul, breakbulk shipments that are essential to agriculture and light industry.

C. WATER TRANSPORT

Network: Broadly speaking, China's large navigable rivers are grouped in three basins: the Heilongjiang (Amur River) system in the northeast, the Changjiang (Yangtze River) system in central China, and the Zhujiang (Pearl River) system in the south. The Huanghe (Yellow River), which drains the north China plain, is plagued by heavy silting; its navigational use is quite limited. The generally west-to-east flow of these rivers is complemented by the north-south Grand Canal (completed 700 years ago), which still provides an important transport corridor between Hangzhou and Beijing. China's 18,000-km coastline provides a second north-south channel for waterborne transport.

At the end of 1988, China had about 109,400 km of navigable inland waterways.[37] However, "navigable" in this context means a depth of 0.3 m—a mere foot of water. Of China's waterways, only about 20,000 km are regularly maintained to a depth of 1.0 m or more year-round, and fewer than 5,000 km can accommodate vessels of 1,000 tons or more. Thus, China's waterways are really two separate systems: four major corridors (coastal, Changjiang, Pearl River, and Grand Canal) on the one hand, and a spiderweb of shallow rivers and canals on the other.

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[36] Mann, pp. 216 and 228.

[37] *Zhongguo Tongji Nianjian 1989*, p. 396.

For transportation purposes, both inland waterways and coastal routes have faced serious difficulties. On the coastal routes, fear of sending ships through the Taiwan Strait hampered the development of cabotage for many years. In the 1980s, however, with the easing of military tension in the Strait and the increasingly overt trade between Taiwan and Fujian, coastal shipping has belatedly developed, though it is still hampered by the legacy of inadequate investment in port facilities. On inland waterways, the scarcity of funding for port facilities (and dredging) has also been a problem, which has been compounded by conflicts over jurisdictions and uses. Decisions on flood control, power generation, etc. were made with little regard for the needs of water transport. Thus, by 1979, more than 2,000 obstructive dams and flood gates had been built on navigable waterways.[38] No doubt many of these obstructions were on minor waterways with modest traffic levels, but some were not. A particularly egregious example is the bridge across the Changjiang at Nanjing, opened in 1968, which prevents vessels larger than 5,000 DWT from traveling upstream, even though the channel of the Changjiang will accommodate vessels of 10,000 DWT as far inland as Wuhan.

Fleet: On the minor waterways, vessels are small in size and traditional in configuration, though motorization is now common and hulls are often constructed of ferro-cement, not wood. On the large rivers, pusher tugs are just beginning to displace the more traditional (and less fuel efficient) tow boats.[39]

Traffic and Operations: As can be seen from Table 5, freight turnover on the waterways has grown by about 9% per year on average since 1978—which significantly exceeds freight growth on the railways but falls well short of the growth on highways. On the passenger side, water traffic grew by about 7% a year in the same period, which was significantly slower than traffic growth on either railways or highways but by no means negligible.

D. PIPELINES

In the early days of the petroleum industry in China, most products were shipped by tanker car on rail. However, the construction of pipelines for oil and natural gas got underway in the 1960s. One particularly important landmark was the completion of the 1152-km line from the Daqing oil field to Qinhuangdao in 1973, and its extension to Beijing (an additional 355 km) in 1975.[40] The current

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[38] Zhou Mingjing, "China's Inland River Transport, " *Dili Zhishi* (Geographic Knowledge), September 1984, pp. 2-4; David M. Lampton, "Water Politics and Economic Change in China," in Joint Economic Committee, 99th Congress, 2nd Session, *China's Economy Looks Toward the Year 2000,* vol. 1, Washington, D.C.: Government Printing Office, 1986, p. 393.

[39] Robert Delfs, "Changjiang Shipping," *China Business Review*, September-October 1981, pp. 17-20; Paul Jensen, "Ports," *China Business Review* , March-April 1989, pp. 20-26.

[40] "Taching Oil Pipeline Reaches Peking," *China Reconstructs,* October 1975, pp. 15-16.

TABLE 5. Growth of the Waterway Subsector, 1952–89 [1]

Year	Freight Traffic (million tons)	Freight Turnover (billion ton-km)	Passenger Traffic (million)	Passenger Turnover (billion pass-km)
1952	51.3	11.8	36.1	2.5
1957	153.8	33.9	87.8	4.6
1965	227.5	43.3	113.7	4.7
1978	396.3	129.2	230.4	10.1
1979	389.8	139.3	243.6	11.4
1980	383.8	152.1	264.4	12.9
1981	369.6	150.7	275.8	13.8
1982	397.2	170.8	279.9	14.5
1983	403.0	181.1	272.1	15.4
1984	413.5	196.1	259.7	15.4
1985	567.0	237.1	308.6	17.9
1986	757.3	270.0	343.8	18.2
1987	730.0	283.9	389.5	19.6
1988	807.5	310.4	350.3	20.4
1989	n.a.	n.a.	319.0	18.7

[1] Data for 1952–88 from *Zhongguo Tongji Nianjian 1989* (1989 Statistical Yearbook of China); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990). Includes inland and coastal traffic, but not overseas shipping. Data through 1984 cover Ministry of Communications vessels only.

system extends for 15,100 km and makes an important contribution to easing congestion on the railways. (In 1989, the freight turnover by pipeline was about 6% of railway turnover.)

As can be seen from Table 6, pipeline traffic has grown quite slowly since 1978 (less than 4% per year on average), even though the network was being expanded by about 5.2% a year. This pattern reflects the production constraints that were occurring in the petroleum industry, rather than problems with the pipelines themselves.

TABLE 6. Growth of the Pipeline Subsector, 1952–89 [1]

Year	Route Length (km)	Freight Traffic (million tons)	Freight Turnover (billion ton-km)
1952			
1957	—		
1965	400	n.a.	n.a.
1978	8300	103.5	43.0
1979	9100	113.4	47.6
1980	8700	105.3	49.1
1981	9700	109.3	49.9
1982	10400	111.7	50.1
1983	10900	116.2	53.4
1984	11100	125.4	57.2
1985	11800	136.5	60.3
1986	13000	148.3	61.2
1987	13800	151.4	62.5
1988	14300	156.2	65.0
1989	15100	156.4	62.9

[1] Data for 1952–88 from *Zhongguo Tongji Nianjian 1989* (Statistical Yearbook of China 1989); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990).

In the early 1980s, some Chinese agencies expressed great enthusiasm for the possibility of using pipelines to move coal (in slurry).

Outside observers have generally been critical of these proposals, both because of their high construction cost and because of the scarcity of water in China, and little has been heard of these plans in recent years.[41]

E. CIVIL AVIATION

Recent developments in civil aviation are discussed in detail in the accompanying article by Charles Barton, and therefore I will make only a few brief comments on traffic levels. As can be seen from Table 7, the growth of freight traffic by air has averaged nearly 20% a year since 1978, and passenger traffic has grown almost as fast (about 19% a year). This is even more explosive than the growth of traffic on the highways in the same period. However, this growth occurred from a very small base, so the share of traffic carried by air in 1989 was still extremely modest accounting for only about 3% of total passenger-km on all modes, and for less than 1/10 of 1% of total ton-km.

TABLE 7. Growth of Civil Aviation, 1952–89[1]

Year	Freight Traffic (thousand tons)	Freight Turnover (million ton-km)	Passenger Traffic (thousands)	Passenger Turnover (million pass-km)
1952	2	2	22	24
1957	8	8	69	80
1965	27	25	272	248
1978	64	97	2309	2791
1979	80	123	2980	3499
1980	89	141	3431	3956
1981	94	170	4013	5016
1982	102	198	4452	5951
1983	116	229	3915	5896
1984	150	311	5542	8350
1985	195	415	7468	11695
1986	224	481	9964	14631
1987	299	650	13100	18700
1988	328	730	14420	21448
1989	310	690	12830	18700

[1] Data for 1952–88 from *Zhongguo Tongji Nianjian 1989* (1989 Statistical Yearbook of China); data for 1989 from *Zhongguo Tongji Zhaiyao 1990* (A Statistical Survey of China 1990).

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[41] Martin Weil, "Coal Slurry in China," *China Business* Review, July–August 1983, pp. 21–24.

CHINA'S GROWING AIRLINES AND AVIATION INDUSTRY

By Charles Barton *

CONTENTS

	Page
Introduction	469
I. Airlines	469
II. Aviation Industry	473
1950s: Early Growth	473
1960s: Readjustment and Resurgence	474
Opening China's Doors	475
Priorities in the Next Decade	477
III. Appendix: Aviation Factories in China	478

INTRODUCTION

Tang Xiaoping, executive vice president of the China National Aero-Technology Import Export Corporation (CATIC), said in Beijing on June 26, 1990 that a major goal of China's aviation industry in the coming decade is to shift from military to commercial production. He sees the tremendous world-wide demand for commercial aircraft as a major opportunity for China.

American aerospace leaders and policy makers need to know more of China's growing aviation industry, its importance to China's modernization, and its potential in the international aviation marketplace. This paper reviews the capabilities, problems, current developments, and future goals of both the air transportation and manufacturing sectors of China's aviation establishment.

I. AIRLINES

The last ten years have been a time of change and growth for China's airlines, representing the fastest upgrading of a national civil air transport system in history. The improvements have not come without problems, however.

During the 1950s period of Sino-Soviet cooperation, the Soviet Union assisted China in building up an internal air transport system. Soviet influence survives to this day in the air navigation system, air traffic control, instrument approach procedures, and in airport architecture. Soviet-built aircraft still exist in the Chinese inventory.

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* Aviation Writer/China Specialist. Most of the material in this paper was collected through on-site visits, discussions with Chinese officials and Western repereesentatives of corporations, and various meetings. Most of the historical background is based on information in *China Today: Aviation Industry*, The China Aviation Industry Press, Ministry of Aero-Space Industry, Beijing, 1989.

In 1972, the Boeing 707 that carried President Nixon to China so impressed the Chinese that they bought seven and started on the fleet modernization of CAAC, an acronym which stands both for the Civil Aviation Administration of China and for the airline it operates. The second major catalyst of China's aviation modernization program was the new economic policies of 1978 that opened China to foreign investment and tourist travel.

Demand skyrocketed for air transportation of both passengers and goods. CAAC, with its structure, procedures, and equipment based on 30-year old Soviet models, and a staff of former air force personnel influenced by military rather than commercial attitudes, could not cope. Frequent delays, poor service, and a poor safety record aroused a storm of complaint. The Hong Kong media called CAAC "the airline the world loves to hate." But unchallenged by domestic competition, the object of this scorn continued as before—grossly inefficient, bureaucratic, and indifferent to travelers' needs.

Government circles outside of CAAC pressed for change. A 1985 reshuffle of the State Council, the highest administrative level of the government, made then Vice Premier Li Peng, the Soviet-trained former chief engineer for China's largest hydro-electric complex, responsible for aviation. Li, now China's premier, is comparatively young, energetic, and technically proficient. Also in 1985, the government sent abroad a high-level delegation from the State Council, the Ministry of National Defense, the Air Force, CAAC, and the Ministry of Aviation Industry to study the interaction of government, industry and military in the aviation systems of the leading countries of the world.

In a further action, Beijing named another relatively young technocrat, aviation engineer Hu Yizhou, as director general of CAAC. He replaced Shen Tu, who had failed to take necessary action to reform the old system. Hu's task was to restructure the CAAC empire, separating the governmental and operational functions and forming a modern aviation system.

To do this, Hu wrestled with problems of decentralizing and modernizing a 57,000-employee monopoly during a time of unprecedented growth in numbers of aircraft and routes flown—a Chinese puzzle of immense proportions. New regional airlines were split off from the old monolithic parent and authorized (conditionally, and not immediately) to negotiate and sign contracts with foreign airlines, tourist agencies, cargo agents and other organizations. They could also make suggestions for purchasing and leasing airplanes, selecting air routes, and arranging flights, but CAAC to this day retains final say in these matters. Eventually, however, CAAC is intended to resemble the U.S. Federal Aviation Administration (FAA) in function and responsibility.

The government also allowed the formation of local airlines other than those spun off from the state-run monopoly. Some of these local aviation enterprises are jointly run by local authorities and CAAC, such as Xiamen Airlines, or by provincial or municipal authorities, such as Shanghai Airlines. One of the more successful independent airlines to grow out of this move is United China Airlines, which uses air force aircraft, crews, and facilities. This operation has spawned an air-cargo affiliate, the Baoji Corporation. The new terminal and cargo facilities built at Nan Yuan Air Force

Base near Beijing to support these civil operations have given that military base the look of a civilian airfield.

As part of these ongoing reforms, China's civil airports are becoming independent units. China has about 100 airports for civil use. According to state plans, a total of 10 new airports are to be put into service, and another eight new airport projects started during 1990, but airports will still be far too few for a nation of one billion people—even for its urban population of some 300 million. The United States, a country of about equal size but with less than one-fourth of the population, has 430 airports served by scheduled airlines. Another plan calls for a separate service organization that will handle aeronautical information, telecommunications, navigation and weather reports.

Today, the needs of China's growing air transport fleet (over 100 new aircraft purchased since 1985) exceed the capabilities of the nation's ground support, air traffic control, navigation, and approach control systems. Chinese pilots, air traffic controllers, dispatchers, electronic engineers, and ground support personnel all recognize the need for immediate improvement—a very expensive undertaking. Furthermore, the great variety of aircraft types complicates parts support, maintenance, and the training of flight crews to support the increased level of flight operations.

CAAC's customer relations are still far from smooth, but progress is being made, especially on international flights. One particularly sore point is ticketing. It has heretofore been impossible to buy round-trip tickets for domestic flights, to buy tickets to destinations beyond the first stop, or to arrange confirmed space for each leg of a journey at the time of purchasing a ticket. In a nation where the demand for air transportation exceeds the supply and where poor internal communications have precluded the development of a nationwide computerized reservations system, it is perhaps inevitable that abuses in ticketing and reservations occur.

This situation is being improved by a new computerized reservation system being implemented with the help of UNISYS. However, ticketing and reservations are not just a problem of infrastructure, communications, and computers, says one American businessman in Beijing. There's also an attitude problem—the Chinese way of doing things, a resistance to changing old ways, and the persistence of political connections as the primary means of accessing "luxury" items such as airplane tickets. The problem is complicated by China's cash economy, which make local regions especially reluctant to relinquish their own ticketing and reservations authority.

To develop the aviation infrastructure, China needs technical and financial aid from joint venture partners in industrialized nations and innovative financing to overcome China's chronic shortage of hard currency.

One of Hu Yizhou's first acts as director general was to sign a memorandum of understanding in June 1985 with Lufthansa Chairman Heinz Ruhnau, under which the German airline provided management consulting services in all technical areas, advised on improving the efficiency of CAAC's engineering workshops, and developed a long-term plan for the expansion of CAAC's technical facilities.

This initial memorandum has led to the formation of the Ameco Beijing Aircraft Maintenance and Engineering Corporation, a joint venture of Lufthansa and Beijing-based Air China Airlines, that offers aircraft maintenance and engine overhaul services to both Chinese and foreign airlines. Lufthansa has also joined in a joint venture technical training center to be located at the Bejing Airport maintenance base.

What will Lufthansa gain from these joint ventures? Like other foreign companies operating in China, Lufthansa views its joint venture as a potentially valuable toehold not just in China, but in the entire Far East. By helping to modernize China's aviation industy, Lufthansa hopes to enhance its visibility and reputation abroad, particularly with other potential client governments in Asia.

Maintenance is being provided to China's airlines not only by Lufthansa, but also by Boeing, McDonnell Douglas, Airbus Industrie, British Aerospace, and others who have sold modern aircraft to China. In addition, Lockheed Aircraft Service-International of Ontario, California, and Hutchison Whampoa China Trade Holding Ltd. of Hong Kong have joined with CAAC GRA (Guangzhou Regional Administration) to establish and operate the Guangzhou Aircraft Maintenance and Engineering Company (GAMECO), Ltd., at Baiyun Airport in Guangzhou with an initial investment of $30 million.

The China National Machinery Import and Export Corporation, a commercial operating entity of the Ministry of Foreign Economic Relations and Trade, was at one time the sole organization authorized to negotiate and purchase civilian aircraft. It is still responsible for commerical negotiations for aircraft under the trade agreement with the U.S.S.R.

The Ministry of Aerospace Industry, a combination of the former Ministry of Aviation Industry and Ministry of Astronautics Industry, now oversees and administers China's domestic aerospace industry. Its commercial arm is the China National Aero-Technology Import and Export Corporation (CATIC). CATIC is responsible for the import of foreign technology and equipment to improve China's domestic aerospace production. CATIC often requires that no major aircraft purchase be approved unless the foreign vendor agrees to offset a portion of the aircraft price with purchases of components made in China.

The procurement arm of CAAC is the China Aviation Supply Corporation (CASC). CASC handles the purchase of aircraft, aircraft parts and equipment for CAAC and the regional airlines as well. However, the new joint venture maintenance companies are being empowered to deal directly with foreign vendors of aircraft parts, equipment and components.

A 1980 World Bank report on "Aviation and Development" points out that air transportation is more important to developing countries than to developed countries. Developing countries can build airlines with less capital and in less time than they can build road and rail nets. Furthermore, the benefit to the overall economy is almost immediate.

Chinese leaders agree. Despite problems, much has been accomplished in a short time. Much remains to be done. But China's airlines are on the way.

II. AVIATION INDUSTRY

The accomplishments of China's aircraft factories surprise those who think of China as a labor-intensive agricultural country with little modern industry. China is a land of contrasts. Rockets that place satellites in precise orbits thunder up from launch pads next to peasants tilling the soil with caribou-drawn wooden plows. And in a country that is still poor and underdeveloped in many ways, there are factories that build sophisticated modern aircraft.

1950S: EARLY GROWTH

Since the early 1950s, China has placed heavy emphasis on developing an aviation industry. In May 1953, China and the Soviet Union signed an agreement under which the Soviet Union assisted China in 143 major projects (later increased to 156) of which 13 were for the development of China's aviation industry. These projects included an aircraft factory, an aero-engine factory, and an airborne equipment factory.

In 1953, the Nanchang Aircraft Factory in central China's Jiangxi Province was built to produce piston engine trainers. This was followed by the Zhuzhou Aero Engine Factory near Changsha in Hunan Province producing piston engines, the Shenyang Aircraft Factory in Liaoning Province producing jet fighters, and the Shenyang Aero Engine Factory for jet engines.

Starting in 1956, the focus shifted to the construction of factories such as the Xian Aircraft and Engine Accessory Factory, the Xinping Aviation Electronics and Wheel Brake Accessory factories, and the Baoji Aviation Instrument Factory in Shaanxi Province. These plants were furnished with complete sets of equipment bought from the Soviet Union.

By the end of 1957, China's aviation industry had grown from a small business capable of aircraft repair to an emerging industry with a growing capability to mass-produce piston trainers and jet fighters based on Soviet designs. However, China's own research, development, and independent design capability lagged behind developing production capability.

In 1956, a 12-year development program for science and technology was launched that included mastering and developing jet technology. In 1958, the JJ–1 jet fighter trainer, the first aircraft to be designed and manufactured in China by Chinese—the airframe in the Shenyang Aircraft Factory, the PF–1A jet engine in the Shenyang Aero Engine Factory—was successfully test-flown.

Although the JJ–1 flew successfully, it was not mass-produced because of changed air force training requirements. However, the JJ–1 provided vital design experience basic to subsequent successful designs by the Shenyang design team: the CJ–6 primary trainer (PT–6 in Western nomenclature), the Q–5 series attack aircraft (A–5 outside China), and the J–8 (or F–8) series jet fighters.

By 1960, China's aviation industry had delivered 1,086 aircraft to the air force, including 767 fighters, 278 trainers, and 41 transports, and delivered 216 transports and 17 trainers to China's civil aviation sector. The trouble, however, came with the turmoil casued by the "Great Leap Forward" near the end of the 1950s, followed by the July 1960 cancellation of Soviet technical assistance, the attendant withdrawal of Soviet experts, and three years of natural disasters. In combination, these events greatly retarded the development of aviation.

1960S: READJUSTMENT AND RESURGENCE

The early 1960s was a time of adjustment and reorganization. In September 1963, the government created the Ministry of Aviation Industry (the Third Ministry of Machine Building) under Minister Sun Zhiyuan to organize and direct a resurgence in aviation development.

By 1965, as a result of government and industry efforts, the total industrial output of China's aviation industry was 1.6 times that of 1960. During 1963–65, 1,055 aircraft and 3,081 engines were produced and delivered.

An essential part of this progress was the development of indigenous sources for aeronautical materials and equipment, such as superalloys for jet engines, precision bearings, acrylic plastic sheeting for canopies, aluminum alloys, large castings and forgings, rubber products, special textile materials for high-speed parachutes, and aviation fuels and oils. The mass-produced J–6 jet fighter and the Z–5 helicopter needed 12,319 items and 9,019 items of such materials respectively, of which only 20 percent could be supplied domestically in 1960. By 1965, these items could be fully supplied within China.

Scientific research was key to much of this development. In the early 1960s, in order to organize and administer research, the government set up the Chinese Aeronautical Establishment (the Ministry of Defense's Sixth Research Institute) and a number of subordinate science and product design institutes. In 1964, the Chinese Aeronautical Establishment was merged with the Ministry of Aviation Industry.

Initially, copy manufacturing and reverse-engineering was practiced to train technical personnel, improve design skill, and accelerate the design of new aircraft. Later in the 1960s, there was a shift from copy manufacture to design, and the attendant construction of scientific research and test facilities.

In the late 1960s, the Cultural Revolution again caused great setbacks in aviation education, quality inspection, and rational planning. According to *China Today: Aviation Industry*, published by the China Aviation Industry Press, "capital construction was carried out blindly without planning and feasibility study," plants were dispersed in mountain areas and inside tunnels, and "the investment was not only wasted, but it also left over many outstanding problems which could not be solved for a long time."

During the 1960s and 1970s, the United States, the United Kingdom, France, and the Soviet Union had invested heavily in aeronautical research and development while China's aviation industry stagnated and fell further behind. However, with the downfall of the "Gang of Four" in 1976, the adoption of socialist modernization as the nation's goal, the beginning of new economic policies, and the opening to the outside world, aviation industry began a new period of development.

To counteract the "wrong thinking" of the Cultural Revolution that "production was more important than scientific research," Deng Xiaoping stressed that science and technology were productive forces vital to economic construction. In July 1978, the Ministry of Aviation Industry held a working meeting on aviation science and technology in Tianjin, stressing the vital role of advanced research as a technical base for project development. As one speaker put it: "There is no way of cooking without rice."

OPENING CHINA'S DOORS

The period from 1979 to the present has been the most fruitful in the history of the Chinese aviation industry. A big factor in this development has been the opening of China doors to international investment and cooperative endeavors.

In China, "offset" and "countertrade" agreements must be part of nearly every sale by foreign aviation manufacturers. The resulting technology transfer and the manufacture of parts and subassemblies in China are helping China toward a bigger role in the international aviation market. "We have to start with these small steps," said Mr. Hua Runxi, director of CATIC's Number Two Production Department with responsibilities for engine components, parts export, and engine offsets. "We understand that in the world's aviation industry there is a pyramid. At the top are Boeing, McDonnell Douglas, and Airbus Industrie—these three. On the engine side there are General Electric, Pratt & Whitney, Rolls-Royce, and SNECMA in France. But they have many subsontractors, main component suppliers. We think China should be some place in that pyramid today, but close to the top."

To that end, since 1981 CATIC has established cooperative relationships with nearly all the major aircraft engine manufacturers in the United States: Pratt & Whitney, General Electric, Pratt & Whitney Canada, General Motor Allison of Indianapolis, Textron Lycoming, and Garrett. More recently, Revmaster of the United States, and SNECMA, Turbomeca, Aerospatiale and Messier-Hispano-Bugatti of France have joined the list of customers. Most subcontracted items are related to compensation trade (see appendix A for details of China's aviation factories and their arrangements with foreign manufacturers).

As to products other than engines, one of the first Sino-foreign cooperation projects, the joint manufacture of French Dauphin helicopters in 1980, started with final assembly in China, according to He Wenzhi, Deputy Minister of Aero-Space Industry. Now most of the airborne equipment and airframe components are Chinese-made, he says.

Since 1979, CATIC has manufactured aircraft parts, components and subassemblies under subcontracts from 14 world-famous aircraft manufacturers such as Canadair, Boeing, McDonnell Douglas, British Aerospace (BAE), Aerospatiale, and Messerschmitt-Bolkow-Blohm (MBB). These products include vertical fins for the Boeing 737, the outboard wingbox for the ATR-42, the center wing of the

UK's Shorts Brothers SD360, and doors and control surfaces for a variety of aircraft. A 1988 contract between McDonnell Douglas and CATIC calls for producing complete MD-82 nose sections by the Chengdu Aircraft Corporation, and building horizontal stabilizers by the Shanghai Aviation Industrial Corporation (SAIC). CATIC's Tang Xiaoping said in Beijing in June 1990 that by the first part of 1991 the Chinese will have built the fourth nose secton for the McDonnell Douglas MD-82, and that they are talking with Boeing about increasing the contract for building vertical fins. This relationship between McDonnel Douglas and SAIC, which includes the co-production of 25 MD-82 twin-jet transports, is giving McDonnell Douglas unique access to the Chinese market and helps China prepare for a major role in the international aviation marketplace.

China has a long way to go to approach the top of the international aero-space market pyramid, but progress since 1980 shows that Chinese factories are definitely on the way. In July 1988, Gareth C. C. Chang, then-president of McDonnel Douglas China, noted that there is no longer any question in his mind that since the start of China's cooperation with foreign aircraft companies, the Chinese have proved that they can manufacture, assemble, and fabricate parts "as well if not better" than anyone else. "China is fully capable of building a 50-passanger airplane all by herself," he said, "and can compete with anybody else in the world."

In advising the Minister of Aviation Industry, Chang insisted that "the argument that you are going to build an airplane only for China because you can use lower grade materials, more backward design, that's pure bullshit. Either you're in the aviation business or your're not. If you're in the aviation business, you build an airplane for world consumption."

Perhaps reflecting this attitude, a contract for 20 more McDonnel Douglas MD-80 series aircraft to be built in Shanghai was signed last year. West Germany's MBB is cooperating in developing a 75-seat feeder airliner, the MPC-75, scheduled to fly in 1994. In addition, China has asked for final proposals from Boeing, and McDonnell Douglas for the manufacture in China with Chinese participation about 150 mid-size "trunk airliners" for China's airlines.

China's new emphasis on building commercial aircraft for export is already bearing fruit. In December 1988, the Civil Aviation Administation of Laos signed a contract for two Chinese-built Y-12 aircraft, a 17-passenger high-wing, twin-prop jet airplane that can take off and land on rough, short runways. The Y-12, built by the Harbin Aircraft Manufacturing Corporation in Heilongjiang Province, has a maximum take-off weight of 11,680 pounds and a maximum ceiling of 23,000 feet, cruises at 204 mph, and can carry 3,748 pounds of passengers and cargo a maximum distance of 2,190 miles.

On June 20, 1990, the British Civil Aviation Authority gave the Y-12 an air worthiness certificate which boosted sales. A week later, Tang Xiaoping reported that 10 Y-12 aircraft had been sold abroad so far, six to Sri Lanka and four to Laos, and that other countries were interested in the aircraft.

Sun Zhaoqing, CATIC president, said on June 20 that Sri Lanka had previously purchased two Y-8s in addition to their six Y-12s. The Y-8, build by the Shaanxi Aircraft Factory, is a four-engine turbo-prop transport similar in size and function to the Lockheed Hercules C-130, but non-pressurized and at only half the price.

PRIORITIES IN THE NEXT DECADE

Tang listed two problems in the development of China's aviation industry in the 1990s: lack of money, and lack of certification from the U.S. FAA, the CAA (the British Civil Aviation Authority), or European countries. Without such certification, Tang noted, China would not be able to enter the world aircraft market. Certification by Western countries involves many new concepts for the Chinese and costs a lot of money. China has received CAA certification for the Y-12 aircraft, but, Tang observed, "the bigger aircraft are another story." China has learned a lot about the FAA certification process from the co-production of the MD-82 in Shanghai.

Developing China's human resources is another priority for China's aircraft industry, and essential if China hopes to compete in the high tech market. In his 1986 book, *China Takes Off*, E. E. Bauer of Boeing described situations where Chinese mechanics had a simplistic view of complex equipment. Furthermore, as a result of a legacy of national poverty, they were reluctant to discard any parts or equipment which they considered to be remotely reusable. For example, the Boeing technical representatives found that Chinese mechanics would clean non-reusable high pressure hydraulic system filter cartridges with gasoline and then re-install them even though "non-reusable" was steel-stamped on both ends of the filter element. In additional efforts to save money, the Chinese also substituted Chinese-manufactured oils, greases, gaskets, and O-rings that did not meet required specifications. In general, there was a tendency (not unique to the aircraft industry) to neglect preventive maintenance. As Bauer discovered, the Chinese preferred to solve problems after they developed and not to do anything extra unless there was a direct threat to safety or unless operational experience convinced them it would cost more if the work was not done.

On the other hand, the Chinese skill at "making do" can have its benefits. One McDonnell Douglas quality assurance advisor (QA) was pleasantly surprised by the fine quality of the Chinese workmanship considering what they have to work with. "If they don't have it, they make it," he said. "A couple of Chinese QA people I know will be of great benefit to the company after we leave." Other McDonnell Douglas advisors expressed their admiration for the technical ability and motivation exhibited by Chinese workers, commenting that "American workers are going to have to look out." This does not mean, however, that Chinese workers on the MD-82 project are all highly motivated paragons. An hour before quitting time there is a noticable slackening of effort among those not involved in the priority actions of the moment and the Chinese traditional mid-day "xiu xi," or rest period, results in long lunch periods. This led one American to observe that "to the Chinese, work is a place to which you go for lunch."

Another workforce problem, according to Werner Hupe, Lufthansa's senior technical advisor and general manager of their Technical Joint Venture Project, is that the Chinese are somewhat inexperienced in the paperwork processes used to ensure that jobs are done completely, correctly, and on time, and that the record is signed by the responsible people. The Lufthansa advisors, with German thoroughness and attention to detail, responded by standarizing all the aircraft log books and other maintenance forms to make the process easier for the Chinese.

Despite the problems, most American manufacturers seem to feel that overall, Chinese aviation mechanics, factory workers, and technicians are doing very well, and their efforts are paying off. In November 1987, the FAA granted a production certificate extension for the co-production of MD-82 aircraft in Shanghai, and in June 1988 granted a fabrication assembly certificate to the Shanghai Aviation Industrial Corporation for manufacturing parts for this aircraft. At the Beijing Maintenance Base, FAA granted a repair station license to the wheel shop. Other licenses are pending as technology and up-to-date equipment are transferred to the Chinese. Slowly but steadily, the Chinese are meeting their 1990s goals.

Unlike some of the other industries, China's civil aviation sector appears to have suffered little in the aftermath of the Tiananmen Square events and subsequent austerity measures imposed by Beijing. Gareth Chang, President, McDonnell Douglas Pacific & Asia, summed up the impact by saying, "As far as the industry is concerned, it's a non-event. Our relationship has not deteriorated or improved as a result."

Underlying China's drive for modernization is the desire to restore China to greatness, to restore pride and place after two centuries of humiliation. But it is also in the interest of other nations to have a developed, prosperous China as a trading partner. The development of Chinese air transportation and aviation industry contributes to these goals.

III. Appendix: Aviation Factories in China [1]

AIRCRAFT AND COMPONENTS

BADDING PROPELLER FACTORY, P.O. Box 818, Branch 608, Baoding, Hebei Province. The only propeller manufacturer in China. About 4,000 employees. Aero-products include: propellers, governors, speed limiters, feathering pumps, helicopter rotor hubs, tail rotors, etc.

CHANGHE AIRCRAFT FACTORY, P.O. Box 109, Jingdezhen, Jiangxi Province. Telex 95027 CHAF CN. Employs 6,000 staff and workers. Aero-products include the Z-8 helicopters with 13 tons takeoff weight. (Many civil automotive products)

CHANGZHOU AIRCRAFT FACTORY, P.O. Box 16, Changzhou, Jiangsu Province. Telex 361019 BOOTH CN. Employs 1,200 staff and workers. Aero-products include light and small helicopters, pilotless aircraft, and high pressure gas bottles.

CHENGDU AIRCRAFT CORPORATION, P.O. Box 800, Chengdu, Sichuan Province. Telex 60132 CCDAC CN. The J-7 (F-7) high altitude high speed fighter has been produced here since 1967. It produces MD-82 nose sections for McDonnell Douglas. Has about

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[1] Source: *Survey of Chinese Aviation Industry*, 1989/1990, Aviation Industry Press, Beijing, People's Republic of China, 1989.

20,000 workers and staff of which more than 2,700 are technical staff. Main-aero products: four types of fighter, one trainer.

GUIZHOU AVIATION INDUSTRY CORPORATION, P.O. Box 38, Anshun, Guizhou Province. Telex 66018 AIMGA CN. A grouping of many different enterprises, factories and institutes engaged in R&D, advanced computer applications for quality control and CAD/CAM, manufacturing technology, etc. Employes 18,000 technical and professional people. Main products: a high altitude high speed fighter and its trainer version, two series of turbojet engines, air-to-air missiles, fuel pumps, rocket launchers, hydraulic pumps, various airborne DC and AC generators, electrical converters, relays switches, connectors, electro-operated mechanisms, electromagnetic valves, hydraulic valves, etc. Especially strong in design and production of small to medium size aircraft with wing span less than 20m (65 ft).

HARBIN AIRCRAFT MANUFACTURING COMPANY, P.O. Box 201, Harbin, Heilongjiang Province. Telex 87082 HAF CN, Fax 0451-227491. Has more than 15,000 staff and workers of which over 2,000 are engineering and technical people. Owns three design and research institutes. Aero-products include the Y-12 (a 17 passenger, high wing, twin prop-jet airplane that was granted a UK CAA airworthiness certificate in June 1990), and Z-9A helicopters. Subcontracts central wing panels and cabin doors for Short Bros., eight kinds of mainlanding gear and other doors for BAe, machined products and composite material components for Skorsky, cabin doors for Dauphin helicopters, etc.

NANCHANG AIRCRAFT MANUFACTURING COMPANY, P.O. Box 5001, Nanchang, Jiangxi Province. Telex 95068 NHMC CN, Fax 41112 ext 2272. Over 20,000 staff and workers, 22% of which are technical people. An integrated complex of factories and design institutes—4 R&D institutes, 9 subsidiaries and factories, several dozen workshops. (Has an advanced level production line for motorcycles.) Aero-products include: Q-5 (A-5), Q-5III, Q-5M attack, and L-8 aircraft, as well as FL-1, FL-2, and FL-3A missiles.

SHAANXI AIRCRAFT COMPANY, P.O. Box 35, Chenggu, Shaanxi Province. Telex 70141 STAF CN. Employs 10,000 staff and workers, 15% engineering and technical people. Company combines R&D and production. Has 11 divisions, 2 design and research institutes, 2 workshops, and the largest final assembly building in China. Aero-products include the Y-8 four prop-jet transport, comparable to Lockheed C-130 Hercules. Two have been sold to Sri Lanka.

SHAANXI AERO-HYDRAULIC COMPONENT FACTORY, P.O. Box 43, Yang County, Shaanxi Province. Telex 71207 SAITC CN. A specialized factory for the production of landing gears, hydraulic accessories, rubber and plastic products, and arc welding rods. Employs more than 2,600 staff and workers. Aero-products include landing gear and all hydraulic components and rubber parts for the Y-8 transport.

ENGINE AND COMPONENT MANUFACTURERS

CHANG KONG MACHINERY FACTORY, P.O. Box 924, Beijing. Telex 222819 CKMF CN. More than 2,000 employees, 20% are technical staff. Aero-products include engine fuel pumps, fuel governors, and other engine accessories.

CHANGZHOU LAN XIANG MACHINERY WORKS, P.O. Box 37, Changzhou, Jiangsu Province. Cable 5046. Has 11 specialized factories, 8 shops, 2 product development departments, 1 tooling department, 3 meteorological inspection and test centers, and equipment service center. Employs over 5,000 of which more than 1,000 are technical staff. Main aero-product is the WZ-6 helicopter engine. (Much non-aero, industrial production)

CHENGDU ENGINE COMPANY, P.O. Box 613, Chengdu, Sichuan Province. Telex 60142 CET CN. Fax 442470. More than 20,000 employees in 9 specialized factories, 2 subsidiary companies, and 2 research institutes. Of over 5,000 technical staff there are nearly 2,000 engineers and 500 senior engineers. Has a 25-year contract with United Technology Corporation for producing FT-8 industrial gas turbines. Aero-products include WP-6 and WP-13 turbojet engines as well as the flame tube, gas collector section, ring and pipe of the Pratt & Whitney JT-8D turbofan engine. Much non-aero production.

CHINA NATIONAL AEROENGINE CORPORATION, No. 67, Jiao Nan Dane, Beijing. Cable 9696. Engaged in scientific R&D production and operation of aero-engines and other products, and is authorized to independently handle foreign trade. Has 16 factories and research institutes located in Beijing, Harbin, Shenyang, Xi'an, Chengdu, Changzhou, Zhuzhou, Jiangyou, and Wuxi with a total of 130,000 employees. Much non-aero production and marketing.

CHINA NATIONAL LIGHT-WEIGHT GAS TURBINE DEVELOPMENT CENTER, No. 67 Jiaonan Dajie, Beijing. Telex 22318 AEROT CN, Fax 4015381. A division of the China National Aeroengine Corporation founded in 1985. Main product is the FT-8 gas turbine engines , jointly designed, manufactured and sold by the Center and Pratt & Whitney and Turbo Power & Marine Systems, soon to be available on world market.

DONGAN ENGINE MANUFACTURING COMPANY, P.O. Box 51, Harbin, Heilongjiang Province. Telex 87082 HEF CN. Since 1948, the company has moved from repairing to manufacturing, from piston engines to turboprop engines, and from military production to both military and civil products. Has two design departments (for aero- and non-aero- products) and six specialized factories. Employs 10,000 of which 12% are technical people. Aero-products include the WJ5A-l engine for the Y-7 aircraft, reduction gear box for the Dauphine helicopter, repaired Mi-8 helicopter engines for Pakistan, Sudan, and other countries.

LIMING ENGINE MANUFACTURING CORPORATION, P.O. Box 424, Shenyang, Liaoning Province. Telex 80025 CMMCS CN, Fax (024)732221. China's first turbojet engine factory, founded iin 1954. Employs more than 20,000 of which over 3,000 are technical staff and engineers. Products: aeroengines WP6-B and WP7-C and their parts; co-generating gas turbine sets rating at 4,500 kw; and civil products.

LIYANG MACHINERY CORPORATION, P.O. Box 5, Pingba, Guizhou Province. Telex 66044 LYMCG CN. Began manufacture of aero turbojet engines in 1970. It employs over 10,000 of which 15% are technical staff including about 1,500 engineers. It combines

R&D with production, has 3 specialized factories and one research and design institute. Aero-products include WP7 and WP13 turbojet engine series in 11 versions. It has begun to export these to 6 countries and since 1985 has built up a development and production capability for dozens of non-aero-products.

SHANGHAI AEROENGINE MANUFACTURING PLANT, No. 600 Guangzhong Road, Shanghai. Telex 33136 SHAIR CN. Fax 651482. Employs about 2,000 including over 500 technical staff. In the 1970s the plant successfully developed China's first turbofan engine, repaired JT3D-7 engines for CAAC and manufactured more than 20,000 military engine spare parts. Main aero-products include WS8 turbofan engines, 3K42 light duty gas turbines, and a variety of jet engine parts.

SHANGHAI AERONAUTIC MACHINERY PLANT, P.O. Box 254, Shanghai, Cable 8215. Employs more than 1,300 including 139 engineers. Except for aero-hydraulic products is now mostly engaged in civil production of hydraulic and refrigeration machinery, etc.

SOUTH MOTIVE POWER AND MACHINERY COMPLEX, P.O. Box 211, Zhuzhou, Hunan Province. Telex 995002 CHENF CN. Fax (086) (0733) 24220. China's first aero-engine was built here. Has over 10,000 employees including 3,000 technical personnel. Main aero-products include WJ6 turboprop engine for medium transport planes, WZ8A turboshaft engine for light helicopters, HS6A to HS6K series engines for small transports and agricultural planes, and WJ6Gl through WJ6G4 engines for industrial and marine applications.

XI'AN AERO-ENGINE CORPORATION, P.O. Box 13, Xi'an, Shaanxi Province. Telex 70102 XIARO CN. Employs more than 10,000 with more than 4,000 technical staff. Main products include turbojet and turbofan engines, 6,000 and 13,000 hp gas turbines, and many civilian products.

ZHONGNAN TRANSMISSION MACHINERY FACTORY, formerly in Yuanling, now has new plant in Wangcheng, a suburb of Changsha, Hunan Province. Cable 2830 Wangcheng. Has 3,000 staff, 15% engineering. Aero products include gears for HS-5, HS-6, WJ-6, WJ-9, and Z-9 engines; main and tail reducing gears, accessories such as oil pump, and middle and tail speed reducer for Z-8 helicopters. Many commercial products.

CHINA'S TELECOMMUNICATIONS AND AMERICAN STRATEGIC INTERESTS

By Ken Zita *

CONTENTS

	Page
Summary	482
Introduction	
Part I: Modernization Goals	482
Services	484
Private Networks	485
Organization and Political Control	486
Research and Development	490
Part II: Considerations for American Policy	491
Soft Loans	492

FIGURES

1. Functional Responsibilities of Government Organizations	488
2. Manufacturing Mandates	489

SUMMARY

China's antiquated telecommunications infrastructure is a serious impediment to broad scale modernization of the Chinese culture and economy. Part I examines the overall state of telecommunications development in China and the formation and implementation of industrial policy. The roles of various organizations are assessed in the context of telecommunications services, private networks, organization and political control, and research and development. Part II is an assessment of American strategic interests in the telecommunications sector in China, both from the security and the commercial perspectives. "Soft loan" financing is also assessed, along with other questions relevant to U.S. policy.

INTRODUCTION

China is preparing for its next revolution: the Information Age. Telecommunications has been a state strategic priority since 1985, when the government of Zhao Ziyang first began to recognize how the power of information networks could support the broad-based effort to modernize and reform the national economy. For China to step successfully into the modern era, the entire archaic public telecommunications infrastructure needs to be replaced. Basic telephone service is among the poorest in the world, and the lack of

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computer-to-computer data communications is a major bottleneck in China's economic reforms—regardless of the ideology of the nation's leaders. China needs to surmount considerable barriers in the telecommunications modernization effort, including organizational restructuring, financing, and improved supervision over network operations.

This paper is divided into two sections. Part I, Modernization Goals, is a review of current organizational challenges facing China's national planners. Part II, Considerations for American Policy, is an analysis of the American strategic interests relevant to telecommunications development in the PRC.

PART I: MODERNIZATION GOALS

The shortcomings of China's telecommunications are well known.[1] Despite an increase in switching lines from 6.2 million in 1979 to 14.9 million in 1988 and steady improvements in calling service, nationwide telephone density is only 0.75 telephones per 100 population, or one phone for every 133 citizens. In China's vast countryside, density falls to an astonishing .17, or one phone for every 500 residents.[2] Both figures are well below even the developing world's average density of three telephones for every 100 people. Most of China's 7.8 million telephone stations, moreover, are in offices with limited public access. Only officials with deputy director status (or who have special political connections—and a lot of money) are entitled to private telephone service.[3]

The telecommunications industry in China is crippled by three strategic weaknesses. First, there is little vertical integration of local and toll services, which skews economies of scale in capital investment and revenue collection, and leads to technical inconsistencies among regional networks. Second, R&D and telecommunications manufacturing are split helter-skelter between two rival entities, the Ministries of Posts and Telecommunications (MPT) and Machine Building and Electronics Industry (MMEI), and the competition between them strains already scant resources. Third, state funds—especially foreign exchange for imports and joint ventures—are extremely limited, and impending financial reforms in telecommunications will sharpen the crisis.[4]

China hopes to raise the number of telephones to 33.6 million by the year 2000, adding some 10–15 million virtual circuits or line equivalents. Analog service is expected to be extended to the smallest towns, and digital switching and transmission corridors are slated to link provincial capitals and big cities. Fiber and sophisticated switching systems will upgrade urban centers.

Success of China's long-range development plan is contingent on a number of factors, including:

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[1] See Ken Zita, ***Modernising China Telecommunications*** (*MCT*) (London: The Economist Publications, 1987) and Pyramid Research, *China's Telecom Strategy*, (Cambridge, MA: Pyramid Research, 1989).

[2] Ken Zita, "Telecommunications in China," International Telecommunications Society (Cambridge, MA), June, 1988.

[3] Ken Zita, "China's Great Leap Forward," *International Herald Tribune*, October 20, 1987.

[4] Ken Zita, "Telecommunications: China's Uphill Battle to Modernize," *China Business Review* (*CBR*), November–December, 1989.

- The MPT assuming a more balanced leadership role. MPT needs to hand over responsibility for policy planning and operations in local areas to provincial authorities, and simultaneously consolidate and strengthen its primary role as the national long distance carrier. MPT allows provinces latitude in local daily management decisions but continues to manage foreign exchange quotas for local import purchases, often overriding local planning sentiments.
- The adoption of a coherent policy for managing domestic manufacturing. Currently, China's industrial base for telecommunications is fragmented by regionalism, inter-ministry rivalries, inefficient factory management, and a lack of reliable financing.
- Local bureaus of the MPT boosting internal generation of funds through local tariffs by encouraging municipal governments (and indeed the central government) to allow placement of long term bonds. China's shortage of domestic capital and foreign exchange is a serious obstacle to growth, and reappraisal of both the telecommunications cost/pricing and external financial systems are essential.[5]

SERVICES

Local telephone services throughout China are controlled by state-run monopolies, usually at the provincial or municipal level. Affluent and relatively sophisticated cities are building modern networks based on the latest foreign technology, while poorer regions are making do with basic technology. The government hopes to spearhead advances in selected regions to raise the overall capabilities of the network, thereby catalyzing cultural and commercial development—technology and economic "trickle-down," with Chinese characteristics. Suburbs of cities with big construction budgets will benefit, though most areas will have to wait. Even with Li Peng's stated attempt to rationalize the economic disparities between the coastal provinces and the interior, network growth will occur fastest along the seaboard. The result is the formation of a two-tier network. Until recently, telephone service in China was everywhere the same: that is, poor. Now, the cities of the east coast are installing advanced imported systems while the nation's interior—the agricultural belt with increasing riches but limited urbanization—lags behind.

Network stratification poses an important social and economic question: Who will benefit from new information technology? In a macroeconomic sense, any municipality that can afford imported equipment can proceed immediately with network modernization. Other regions must compete for an ever-shrinking share of direct government spending, attempt a "middle-road" course of network development based on domestic analog technology (if available), or simply postpone development of the local telephone infrastructure—resulting in relative economic and cultural isolation. Even though 80 percent of the Chinese population lives in rural areas, rural network development has none of the fanfare and little of the potential surrounding the bustling digital expansion in the cities. Before 1949, telephone service in the hinterlands was nonexistent. Today, rural areas are still considered poor country cousins: at year-end 1987, only about 3.09 million lines served a rural population exceeding 800 million.[6] The cumulative waiting list for local service in China is estimated at 850,000, with 100,000 or more in Beijing alone, and the numbers would be higher if the public realistically believed it possible to obtain service.[7] Further, distinction can be made among different classes of services available, related to the various grades of equipment being installed. Priority calling status on quality equipment is assigned; as a result, some users get instantaneous local dial tone and international long distance dialing over digital circuits, while others wait for lines on crackling and decrepit systems. Who gets what, when and on which terms?

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[5] Financial issues are a complex area and beyond the scope of this paper. For further details, see: Ken Zita, "Steps Toward Political and Financial Reform in China's Telecommunications Sector," in *Telecommunications in the Pacific Rim*, Eli Noam, Ed., (New York: Columbia University Press, 1990).

Information technology presents special difficulties to China's concept of distribution of public resources. Though the state has been relatively effective in providing health care, housing, and transportation, China simply cannot afford to provide everyone with a telephone, with a resultant disparity of opportunity. With access to effective telecommunications comes access to prosperity, social mobility, and virtually limitless horizontal communication within society. Consider the discrepancies between China's new information "haves" and "have nots": a small packaged goods enterprise in Nanjing is granted three clean local trunk lines via which it can source price information for raw materials all over Jiangsu Province. A competing enterprise, without equal political access or financial clout can scarcely holler across town over a single faltering or perennially blocked line. One firm can meet the dynamic demands of the emerging market economy in China; the other is held back by antiquated infrastructure. So far, however, telecommunications expansion in China today is a business phenomenon: most new systems are installed in government agencies, institutions or cooperatives. The goal of universal service—that every citizen is entitled to telephone service—is not a stated goal of the PRC, and given development constraints will not likely be a viable priority before the turn of the century.

PRIVATE NETWORKS

The second dimension of Chinese telecommunications is the development of private national networks. Beginning in 1976, the central government granted permission to four ministries—those of coal, petroleum, railways and water and power—to build their own systems to handle internal communications. At the time, the Ministry of Railways and the People's Liberation Army (PLA) already had systems in place, and it was widely recognized that the public network was a liability to effective communications—a critical consideration in the wake of the cultural revolution.

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[6] Liang Xiong-Jian and Zhu You-nong, "The Development of Telecommunications in China," in *Telecommunications in the Pacific Rim*, Eli Noam, Ed., (New York: Columbia University Press, 1990).

[7] Chen Weihua, "Growth Requires Better Communications," China Daily Business Weekly, June 27, 1988.

Today, private networks are proliferating. The People's Bank of China is investing an estimated $1 billion on a private network, and with China speeding toward reunification with Hong Kong in 1997, greater access to international networks will be required by all major enterprises.

The private network development strategy within China is vital to full-scale modernization of the national economy. Each of the ministries can be viewed as separate lines of businesses in a state-run conglomerate, each with headquarters in Beijing, each contributing to the government's centrally planned bottom line. With economic decentralization racing to divest operational control from Beijing, the state needs a national management information system (MIS) to keep track of geographically disperse activities and resources. Without an MIS structure to keep planning policies in line, Beijing could lose yet more control over profit and loss centers (provincial or outlying offices, factories, independent enterprises and cooperatives) than intended by economic restructuring. Private networks are insurance that all roads will continue to lead to Beijing.

As with private telephone companies in the United States, the MPT is threatened by large users "bypassing" the public network with private systems. In response, MPT is planning an "overlay" data network based on satellite technology to be developed in conjunction with AT&T and Japan's KDD to meet the special communications needs of large organizations.

ORGANIZATION AND POLITICAL CONTROL

Telecommunications equipment manufacturing in China is a fragmented, and sometimes bitter, competition between MPT, the national long distance carrier and manufacturer of selected products; and MMEI, the State Council's "favorite son" and a highly subsidized research center for components and software. The principal result of the competition is that despite formidable resources, China can report few economies of scale and only poor synergy among R&D, product definition, and manufacturing of telecommunications.

The current strategic framework for industrial development in the information sector was formulated by the Group for the Revitalization of the Electronics Industry (ELG), a council of high-level technocrats within the State Council, during the group's short-lived tenure from 1985–1988. Under the tutelage of Li Peng, the ELG set the strategic path and development priorities for five electronic industry subsectors: computers, telecommunications, software, integrated circuits, and sensors. Though functionally disbanded, the ELG has left an indelible mark on the industry's future by establishing structural rules and guidelines for many of the most important development decisions facing the information industry in China.

The ELG's conceptual recommendations, such as limiting the number of foreign electronics suppliers and targeting specific technologies for exploration and growth, are given tangible form by the

State Planning Commission (SPC) and the State Science and Technology Commission (SSTC). The SSTC recommends how R&D funding should be spent, while the SPC actually controls the budgets. In late 1984, the SPC sought to ease the rivalry between the MPT and MMEI by parceling specific R&D tasks to each organization. The compromise made the MPT primary user of telecommunications equipment, while MMEI was viewed as the primary manufacturer. See Figure 1.

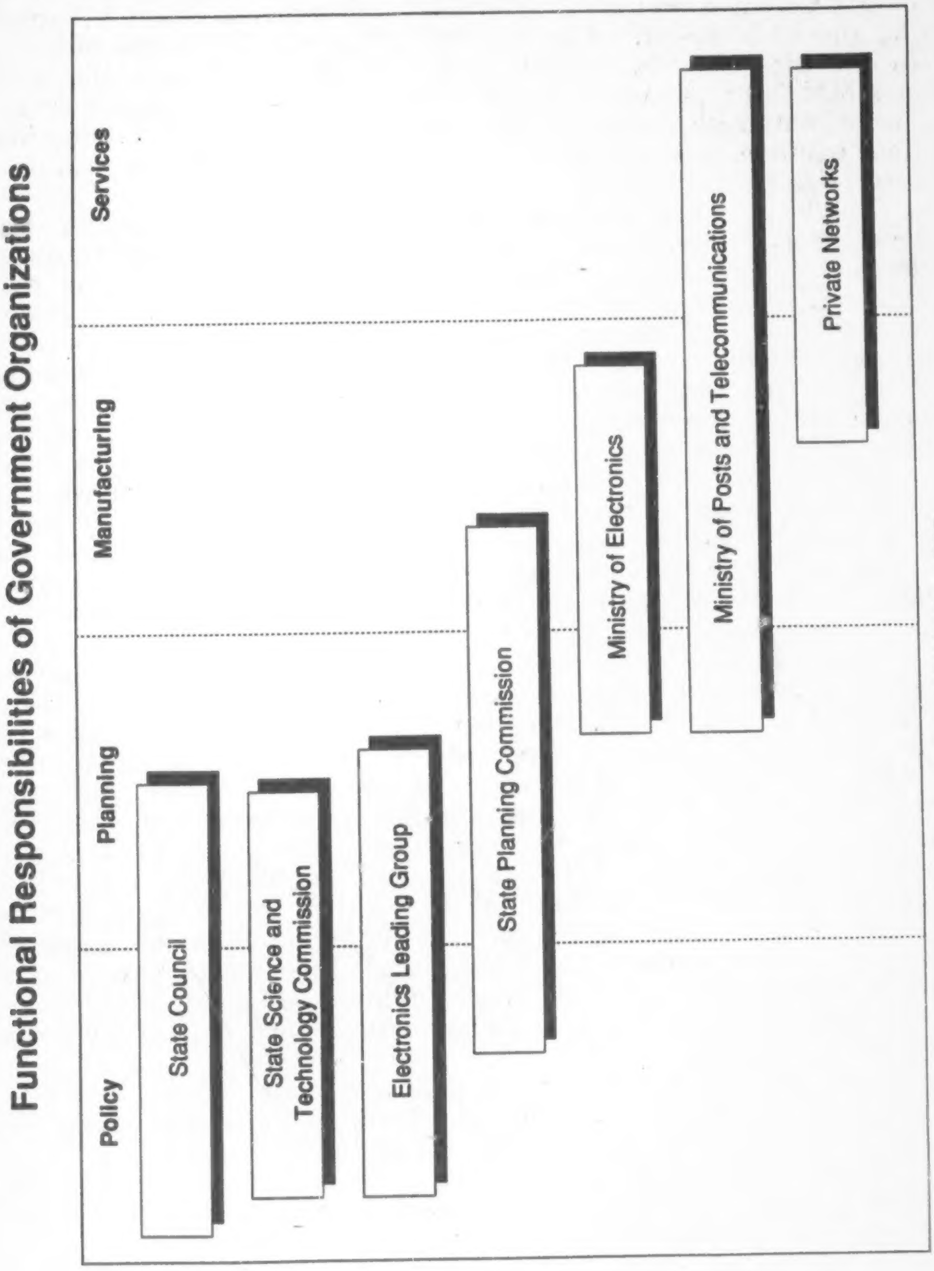
This demarcation is deceptively neat. The MPT manufactures a great deal of telecommunications equipment and will continue to do so in the future. It currently commands the central office and PBX manufacturing sector and is a stakeholder in optical electronics and line multiplexer equipment. MPT manages China's only digital switching facility, the Shanghai Bell Telephone Company joint venture with Alcatel. MMEI, on the other hand, makes approximately 90 percent of all telecommunications components, from mechanical relays and printed circuit boards to capacitors, transistors and integrated circuits, and is slated to boost central office production at two new facilities, with Germany's Siemens and Japan's NEC. A further distinction between the two ministries is that MPT's systems are installed almost exclusively in the public network, while MMEI's equipment is sold chiefly to the military and private networks. (Figure 2).

Under SPC/ELG guidance, a program has evolved to support "leading" research institutes that pursue key development projects. The MPT's Research Institute No. 1 in Shanghai, for instance, is slated to become China's foremost (domestic) PBX design center; MMEI's Factory No. 738 in Beijing is destined to be the center for new research in large switches. Similar assignments—in some instances more than one—have been made for all strategic technologies: lightwave fiber (MPT in Wuhan and Shanghai); satellite earthstations (MMEI in Nanjing); PCM (MPT in Chongqing); integrated circuits (MMEI in Beijing and Nanjing), and so on. Leading research and manufacturing sites are all reported to have ample budgets, access to foreign exchange, highly qualified staff, preferential taxes and, frequently, permission to licence technology from abroad.

The assignment of government-sponsored leading enterprises and factories contrasts sharply with the dominant industrial structure in China. Ministries and municipalities have historically encouraged local self-reliance, a strategy that surrendered manufacturing efficiency to community rule. For example, one can still find crossbar switch factories that also build assembly line machine tools, test equipment, postal delivery bags, sewing machine motors, household lamps—whatever was needed (or was independently profitable) in the past.

Leading research and production centers will encourage R&D and factory floor specialization, coordinate talented personnel, and do away with ancillary activities. If pursued with conviction, the "leading site" strategy may establish better linkage between research, competent factory management, and production by investing in organizations most likely to meet with technological and commercial success.

FIGURE 1.



Functional Responsibilities of Government Organizations

Policy
Planning
Manufacturing
Services
State Council
State Science and Technology Commission
Electronics Leading Group
State Planning Commission
Ministry of Electronics
Ministry of Posts and Telecommunications
Private Networks

Source: Modernizing China's Telecommunications, The Economist Publications, 1987.

FIGURE 2.

Manufacturing Mandates

	MPT	MMEI	Other
Central Office	☎	☎	☎
PBX	☎	☎	☎
Fiber Cables	☎	☎	
Fiber Terminals		☎	
Microwave	☎	☎	
Carrier	☎	☎	
Satellite			☎
Power Supplies	☎		
Components		☎	

Responsibility for actually implementing ELG/SPC policy rests largely with MMEI. MMEI has no clear bureaucratic mechanism to coordinate planners, R&D facilities, and factories in large-scale projects, however. The ministry can encourage limited association among affiliated factories (which are managed as independent enterprises), but lacks the managerial infrastructure to marshal major development efforts. No single point of strategic control exists within MMEI to harness scattered resources, and planning decisions are often made according to strict financial considerations—that is, who has foreign exchange—and not in line with SPC "leading site" recommendations, developed according to carefully considered research and manufacturing efficiencies.

A case in point is a joint R&D and planned manufacturing venture for a small central office exchange between Italtel, the Italian national suppliers, and MMEI Research Institute No. 54 in Shijiazhuang. Following the ELG's advice, the State Council limited the number of urban central office ventures to three. Feeling left out of the market, Italtel appealed by proposing a project to design and eventually manufacture a small rural central office exchange, while the Italian government made available a soft loan to underwrite the project. In this way, Italtel effectively maneuvered through restrictions established by the central government bureaucracy, and a fourth switching venture was consummated in principle without violating established rules.

The MPT's manufacturing is managed by the Posts and Telecommunications Corporation (PTC), currently a wholly owned subsidiary which tightly controls 27 factories and 100 affiliates. MMEI's more than 1,000 factories, by contrast, were fully divested in the mid-1980s, with only R&D and overall strategic and production planning guided by Beijing.

RESEARCH AND DEVELOPMENT

China's emerging industrial policy for information technology calls for the commercialization of basic research combined with limited strategic alliances with foreigners.[8] The state realizes the shortcomings of its domestic industry and understands the importance of both moving its R&D talents into the marketplace, and acquiring technology and research methods from abroad. But China is keen to avoid the branch plant syndrome—assembly rather than true R&D—that characterizes other newly industrialized countries in Asia, notably Hong Kong and Taiwan. Furthermore, China wants to acquire foreign technology but keep its own R&D independent and evolving.

Though well more than a decade has passed, the scientific and technological community is still reeling from the impact of the cultural revolution. Advanced research (with the exception of certain military projects) was brought to a halt between 1966 and 1976, a critical period in the global development of digital electronics. China's progress in integrated circuit technology, by Chinese accounts then virtually on par with the West, essentially ceased. The result is that Chinese information technology is two to three technological generations behind the West. The engineers and technical workers who suffered most effectively lost 10 years of research and practical experience; they are now the industry leaders holding senior and middle management positions.

Recovery from the "decade of chaos" is complicated by deep currents in Chinese science and technology. Basic science has high status in China; applied science does not. One reason for the dichotomy is the distinction the Chinese make between a quest for knowledge and a search for practical application. Technology is the business of packaging the fruits of scientific endeavor, not of seeking truth. Like traditional Chinese military science, Chinese technological modernization attempts to absorb Western technology without absorbing too much of its culture. Deng Xiaoping has said: "We study advanced technology, science and management to serve socialism, but these things do not by themselves have a class character." This is not entirely true. Technology is a highly political activity and the social context in which it is employed, as well as the managerial system which gives rise to it, reflect highly particular organizational philosophies. To make the step into the information age, a technology management infrastructure has to be created—and it will have to be borrowed from abroad.

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[8] This section is excerpted in its entirety from *Modernising China's Telecommunications*, Chapter 4, "Research and Development."

Some of the effects of Chinese attitudes toward technology, as they affect telecommunications, are as follows:

> The result of a shortage of applied science, or conversely, an overemphasis (from the industrial point of view) on basic research is that China has impressive theoretical potential but little seasoned managerial know how.
>
> Similarly, the advances of basic research do not effectively lead to product innovation. There does not exist an adequate product development cycle (from conception to approval, prototype, testing and production) for important developments. With no technology management, good ideas often never leave the labs.
>
> There are no formal mechanisms for the diffusion of innovations. Chinese technical advances and transferred foreign processes and products often stay within the group which first adopted them, leading to reduplication of research efforts, wasted capital, and limited market penetration.
>
> There is poor allocation of trained personnel due to vertical segmentation of industries and longstanding government policies regulating worker assignments. The R&D environment is not conducive to the cross-fertilization of expertise. The problem is compounded by increased competition and protectionism among newly privatized independent research institutes.

PART II: CONSIDERATIONS FOR AMERICAN POLICY

American strategic policy toward China for more than a decade has been to encourage a stable and prosperous China, and to promote democracy and market-oriented economic activity. Telecommunications, as the salient technology making possible the free flow of information and ideas, is intrinsic to China's progress toward democratic reform. However, the same technologies that make possible the free flow of information are also extraordinarily powerful at restricting it.

In a society like China's—where the need for technological modernization and the potential for political repression are equally great—the power of information networking and processing technology represents a double-edged sword: networking technologies can help decentralize political and economic power, but can also be applied to tighten restrictions on civil liberties. International facsimile transmissions to and from China, for instance, are largely credited with preserving contact with the West during the Tiananmen crisis in June, 1989. At the same time, however, closed circuit CATV cameras in Beijing's streets have been used to identify protestors in the Tiananmen movement, and new call management capabilities are being deployed which enable authorities to potentially intercept and monitor thousands of telephone conversations and fax messages simultaneously from a central source. Similarly, the same satellite and microwave facilities that allowed American audiences to view the movement live were used to restrict coverage to the Chinese public.

Generally speaking, advanced telecommunications networking technology—from telephones and fax to elaborate computer communications architectures—stimulates and distributes economic activity. Networks allow information to flow horizontally within society according to the needs of markets, unimpeded by interference or intervention from bureaucratic control. Modern networks also help reduce computing transaction costs, making data transfers faster and more efficient. These aspects of modern networking directly support American interests to create a strong, market-oriented Chinese economy. Endorsing such progress, however, comes at a cost.

With the introduction of digital switching and optical transmission systems, China's networks will be better able to dodge two important elements of American security interests: network "survivability" and electronic eavesdropping. With latest generation digital central office switches (running the Common Channel Signalling System #7 (SS7) protocol, at present restricted by CoCom), call processing management and intelligence is distributed, and the network can automatically re-route traffic when congestion and outages are encountered. This capability is extremely desirable from a systems administration perspective, and U.S. carriers are rapidly deploying the technology in domestic networks. While SS7 dramatically improves network efficiency, strategic doctrine suggests that an SS7 network could continue operation even after sustaining damage from "surgical strikes" in the event of war. Traditional switching systems, based on a hierarchy, are more vulnerable to disruption. A similar case is made regarding high-speed optical fiber transmission systems. Fiber optics do not radiate electromagnetic signal information (as do conventional copper cables), and so are relatively impervious to existing electronic interception and deciphering techniques. CoCom restricts export of high speed fiber technology to China, paralleling the posture maintained with the Soviet Union; in June, 1990, proposals for a high speed fiber backbone across Siberia were rejected. China currently has indigenous fiber technology and is aggressively investing in optical R&D and manufacturing, and will have widespread optical facilities installed by the turn of the century.

These considerations pose a particularly knotty, and at present unresolved policy question: at what point do the macroeconomic and political advantages gained from improvements in the public network outweigh the liabilities posed to national security concerns? Conflicting positions within the government have led to the current paralysis on the matter, and a clear, unambiguous breakthrough is required for American interests—strategic or commercial—to be fully met in China.

SOFT LOANS

The American competitive position in China is extremely weak compared with Japan, France and Sweden. AT&T, the largest domestic manufacturer of central office network systems, has less than 1 percent share of public network contracts in China, and less than 2 percent share when private networks (such as the military) are included. This inferior market position can be attributed in part to an absence of competitive "soft loan" financing. With the cost of telecommunications infrastructure so great and Chinese buyers so poor, soft loans and concessional "trade aid" have become a sine qua non for most network sales. For many regional telephone bureaus, the use of foreign subsidies is irresistible; as much as 20 percent of Guangdong's capital in the early 1990s may come from abroad.

A U.S.-led embargo on soft loans following the 1989 Tiananmen crackdown was tacitly lifted by mid-1990. The Japanese government has reinstated its commitment to pledge over $5 billion in trade financing to Beijing, a package which includes $300 million in loans slated specifically for telecommunications.

Sweden has underwritten telecommunications contracts in China from 1980–89 worth a total of $183 million, and France contributed an estimated $169 million over the same period. The total value of telecommunications contracts supported by soft loans during the same period for all countries combined amounts to some $727.5 million. This level represents the fourth highest area of infrastructure soft loan spending after electric power, chemical plants, and railroads.[9] Payback terms for government-sponsored concessional loans and mixed-credit packages average 2 to 5 percent with payback over 6–30 years, and may offer a 10–15 year grace period. American firms, armed only with EximBank's token and uncompetitive credits and no concessional funds, continue to be left out of most major development projects.

The issue of potential American soft loan financing for telecommunications projects in China also raises several difficult questions. Specifically, American policymakers need to determine if it is in the nation's strategic interest to ensure American presence in the telecommunications sector in China. With American presence, the U.S. government may be in a better position to assess the relative strengths and weakness of the Chinese information infrastructure. Similarly, the U.S. bargaining position in multilateral export control bodies, notably CoCom, would be more credible if American companies were more viable market actors. Further, American corporations operating in the PRC could extend domestic enterprise network architectures more efficiently on American technology installed abroad.

While these arguments are persuasive, the rationale for spending American tax dollars on more tangible and more immediate opportunities, particularly in a period of budget austerity, are equally compelling. American policy planners must necessarily ask which sector of the population in China would benefit from American trade aid in telecommunications, and how American policy and strategic and industrial interests would gain. The most successful American telecommunications projects in China to date—AT&T's sales to the military, and Motorola's contracts for cellular radio—benefit the established political regime and the nation's elite. Are broader American policy goals of promoting political stability and democratization best met by empowering such groups?

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[9] U.S.-China Business Council, "Foreign Soft Loans to China Telecom Projects 1984–89," *China Business Review*, November-December 1989, pp.26–27.

Proponents of trade financing argue that without export credits, only the elite can afford high-cost, high-performance American technology—and that without convincing support from Washington, American firms will be left out of perhaps the largest growth market in the world. Policymakers could best serve U.S. interests by examining carefully the exact network application for credits proposed for the future. Carte blanche spending for telecommunications export projects would be careless; contracts intended to improve the public communications infrastructure, however, could well prove to be a worthwhile investment in China's development program.

CHINA'S ENERGY OUTLOOK

By David Fridley *

CONTENTS

Page

Summary 495
I. Overview of the 1980s 496
  Coal 498
  Upstream Oil 500
  Downstream Oil 501
  Natural Gas 504
  Electric Power 506
  Nuclear 508
II. Challenges in the Energy Sector 508
  Pricing, Costs, and Financial Performance 509
  Investment 515
  Productivity and Efficiency 517
III. Outlook 519
IV. Conclusion 525

SUMMARY

Economic reform in China has given a major boost to the development of China's energy industries. Demand for energy has risen steadily in response to the rapid expansion of the economy over the past ten years, while economic liberalization and deregulation have stimulated energy output as the energy industries found new sources of capital, labor, and investment opportunities. In the first half of 1980s, the coal, oil, and electric power industries all experienced accelerating rates of growth. After mid-decade, however, an overheating economy, rising inflation, and lower international oil prices had a serious impact on the vitality of the energy industries. At a time when energy demand was soaring, the state-owned energy industries faced a decline in the real value of their output, excessive debt, falling productivity, and sharply higher costs of production. These trends have continued into 1990 despite the economic slowdown engineered in late 1988 and, if left unmanaged, will constrain the ability of the domestic energy industries to meet the energy needs of China's modernization program. This in turn could lead to progressively higher imports of energy, particularly oil, and could limit the speed and scope of economic expansion in the 1990s and beyond.

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I. OVERVIEW OF THE 1980s

The past decade of development in China has wrought enormous changes to the country's economic, political, social, and demographic foundations. The radical shift from strict Maoist central planning to limited market reforms left virtually no one untouched. The economy boomed, sometimes overheating, and the standard of living for nearly all Chinese rose. The energy industries also experienced economic and structural reform in the 1980s, but their strategic importance kept them more closely under central control. Prevented from exercising autonomy over most production and pricing decisions, the energy industries failed to enjoy the boom that deregulation produced in so many other sectors of the economy. Fearing the inflationary consequences of a much-needed rise in domestic coal, oil, gas, and electricity prices, the government stabilized most energy prices, which began to fall rapidly in real terms after mid-decade. As a result, even the immensely profitable refining sector began to see red ink.

Energy output initially fell or stagnated in 1980 and 1981 as the industry closed down many inefficient producers, reduced investment, and reorganized its administrative structure. By 1982, output began to rebound, boosted by the adoption of a second, higher tier of prices applied to marginal (above-quota) production. Except for the natural gas sector, which remained in a prolonged slump, all energy sectors experienced healthy rates of output growth in the first half of the decade, lulling planners into a false optimism about an easing energy crunch. With stockpiles of coal growing and electricity output rising rapidly, investment was scaled back, especially in large state-run energy projects, and price reform was repeatedly put off.

After 1985, a number of factors contributed to a slowdown in energy output. High inflation robbed the industry of part of its purchasing power, and delays in commissioning of new capacity and underutilization of existing plants plagued the coal and power sector. Shocked by the electricity shortages of 1984–85, planners redirected investment capital to the power industry without full coordination in the production and transport of sufficient coal supplies to the new plants. Nevertheless, by 1989, output of hydropower and coal managed to expand by 100% and 68% respectively over 1980, while crude oil output rose by 30%. The laggard has been natural gas; suffering from decades of underinvestment, high costs, and low prices, the industry barely managed to exceed the output level reached a decade earlier (Table 1).[1]

While growth in energy output slowed in the latter part of the 1980s, demand shot up (Table 2). Double-digit growth in virtually every sector of the economy (with the notable exception of agricul-

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[1] Conversion standards used here are those adopted by the State Statistical Bureau, based on a coal equivalent (ce) value of 7,000 kcal/kg (29,307 kJ). Raw coal output (5,000 kcal/kg) is converted at 0.7143 kg/kgce; crude oil (10,000 kcal/kg) at 1.4286 kg/kgce; natural gas 9,310 kcal/m^3) at 1.33 kg/m^3; and electricity, including hydropower and thermal power, at the average rate of coal-equivalent consumption per kWh generated each year. In the 1980s, this ranged from 413g/kWh to 397g/kWh. Conversion of crude and aggregate product volumes to barrels per day (b/d) is based on a standard 7.3 barrels per ton, while individual products are converted based on their specific gravities. Tce figures are first calculated in oil equivalent (oe) volumes before conversion to barrels per day.

Table 1
Primary Energy Production, 1980-89

	Coal ('000 tons)	Oil ('000 b/d)	Electricity (GWh)	Natural Gas (million m^3)	Total ('000 bdoe)
1980	620,150	2,119	58,200	14,270	8,923
1981	621,640	2,024	65,500	12,740	8,852
1982	666,330	2,042	74,400	11,930	9,349
1983	714,530	2,121	86,400	12,210	9,978
1984	789,230	2,292	86,800	12,430	10,898
1985	872,280	2,498	92,400	12,930	11,976
1986	894,040	2,614	94,500	13,760	12,337
1987	927,960	2,683	100,000	13,890	12,777
1988	979,880	2,741	109,100	13,910	13,412
1989	1,040,000	2,752	116,400	14,900	14,076
Average Annual Growth (%)					
1980-85	7.1	3.3	9.7	(2.0)	6.1
1985-89	4.5	2.5	5.9	3.6	4.1

Source: State Statistical Bureau, *China Energy Statistical Yearbook 1989* (Beijing: Statistical Bureau Press), Feb. 1990, p. 81. Hereafter cited as *CESY 1989*.

Table 2
Final Energy Consumption, 1980-88

	Coal ('000 tons)	Oil* ('000 b/d)	Electricty (GWh)	Natural Gas** (million m^3)	Total ('000 bdoe)
1980	388,042	1,262	276,340	13,660	6,995
1981	391,890	1,188	284,070	11,970	6,949
1982	416,831	1,198	301,780	11,440	7,286
1983	448,736	1,240	324,410	11,650	7,760
1984	487,805	1,309	348,400	12,120	8,354
1985	527,044	1,370	381,330	12,370	8,995
1986	516,779	1,479	417,490	12,850	9,213
1987	544,870	1,595	462,400	12,820	9,852
1988	577,052	1,706	508,730	13,510	10,557
Average Annual Growth (%)					
1980-85	6.3	1.7	6.7	(2.0)	5.2
1985-88	3.1	7.6	10.1	3.0	5.5

Source: *CESY 1989*, various pages.
*Including non-power direct crude burning.
**Including oil/gas field use.

ture) created immense strains on the infrastructure for energy production, conversion, transportation, and distribution. Growing shortages of petroleum products induced the government to relax import restrictions on both products and crude oil. A worsening shortfall in electricity production led a number of coastal provinces to import diesel fuel for use in small and inefficient power generators, and a growing volume of above-quota fuel oil began to find its way back to mothballed oil-fired plants. Faced with these fuel and power shortages, many localities adopted the much-publicized policy of *ting san, kai si*—closing plants for three days of the week—and a growing number of urban residents suffered from regular rolling blackouts. Although the three-year economic "readjustment" policy adopted in September 1988 brought economic growth to a virtual standstill by early 1990, energy demand continued its sustained rise, fueled by a high level of suppressed demand that heretofore had remained unsatisfied. In 1989 and 1990, a number of top officials admitted that China is facing a prolonged and chronic energy shortage.[2]

COAL

The coal industry forms the backbone of China's energy economy. Accounting for 73% of total primary energy production and an even higher 76% of consumption (on a calorific basis), coal has found widespread use in industry, transport, household consumption, and as a chemical feedstock. Few other major economies in the world—Eastern Germany, Poland, and Czechoslovakia aside—have such a high dependence on coal in their energy mix.

The 1980s was a period of rapid development of the coal industry, characterized by large-scale investment in central mines, promotion of local mines, and expansion of collective and individual-run mines. Production fell in 1980 from the 1979 high of 635 million tons but resumed its upward trend in 1981. Although the coal industry ended the decade with production two-thirds higher than in 1980, much of the growth came from local mines, which accounted for 75% of the increase between 1980 and 1988; village mines in turn accounted for 70% of the increase in local mine output (Table 3).[3] Village mines currently number about 79,000, of which more than half are unlicensed. In general, they are under-capitalized, under-mechanized, and unsafe, with a mortality rate 4.5 times higher than in central mines.

Production capacity expanded significantly during the 1980s. State investment of over Y45 billion added 165 million tons of new central-mine production capacity between 1980 and 1988, including large collieries of 4 million-ton capacity at Kailuan and Datong.[4] China's largest foreign investment to date, the 15 million-ton Antaibao open-cast mine at Pingshuo, Shanxi, constructed as a joint venture with Occidental of the United States, also began production.

With foreign trade playing only a minor balancing role, coal consumption rose in parallel to production (Table 4). The most rapid increase occurred in the power sector; with the commissioning of numerous new coal-fired plants after 1985, demand growth accelerated to around 12% per year. Rapid growth in the iron and steel industry led to a revival of demand for coking coal, while industrial use grew steadily throughout the decade at an average 6.6%. A decision to move away from steam engines to more efficient diesel- and electric-power-driven locomotives caused transport demand for coal to fall slightly after 1985. A slowdown was also evident in the

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[2] See, for example, the report by Ye Qing, Deputy Director of the State Planning Commission at the Working Meeting on the Conservation and Comprehensive Utilization of National Resources, January 1990, as reprinted in *Zhongguo Nengyuan* (Energy in China), no. 1, 1990, pp. 13–17.

[3] Following Chinese usage, "central" mines refer to those mines under central jurisdiction of the China National Coal Corporation and its related companies in the Northeast and Inner Mongolia. Output from these mines is allocated centrally (*tongpei*), and prices are fixed by he state. "Local" mines refer to state-owned mines under control of the province, county, or district, while "village" mines (*xiangzhen eikuang*) are collectively and individually run enterprises.

[4] *CESY 1989*, p. 22. This figure excludes new capacity from "renovation and transformation" investment, which totalled more than Y18 billion between 1980 and 1988.

Table 3
Coal Production, 1980-89
(million tons)

	Total	State-Run Mines		Local Mines	
		Subtotal	%	Subtotal	"Village" Mines
1980	620	344	55.5	276	105
1981	622	335	53.9	287	117
1982	666	350	52.6	316	137
1983	715	363	50.8	352	159
1984	789	395	50.1	394	195
1985	872	406	46.6	466	238
1986	894	414	46.3	480	243
1987	928	420	45.3	508	261
1988	980	434	44.3	546	295
1989	1,040	480	46.1	560	na
Average Annual Growth (%)					
1980-85	7.1	3.3		11.0	17.8
1985-89	4.5	4.3		4.7	7.4*

*1985-1988.
Source: *CESY 1989*, p. 83. 1989 figures are preliminary.

Table 4
Coal Consumption, 1980-88
(million tons)

	Total	Power Generation	Coking	Industry	Transport	Household Use	Stock Change*
1980	626.0	126.5	66.8	216.4	19.3	115.7	10.2
1981	624.3	127.0	59.1	214.5	20.9	120.9	7.3
1982	658.7	134.3	60.8	231.6	21.7	124.6	(3.3)
1983	697.6	143.2	63.9	253.8	21.9	130.6	(12.5)
1984	767.7	159.4	69.6	278.4	22.8	139.8	(17.1)
1985	827.8	164.4	73.0	297.1	23.1	156.2	(39.1)
1986	875.9	180.1	80.6	311.3	23.0	158.2	(13.5)
1987	935.3	202.9	87.7	338.5	22.4	164.9	16.2
1988	999.1	228.3	88.8	360.9	22.6	175.3	30.8
Average Annual Increase (%)							
1980-85	5.7	5.4	1.8	6.5	3.6	6.2	
1985-88	6.5	11.6	6.7	6.7	(0.8)	3.9	

*positive figures are stock withdrawals.
Source: *CESY 1989*, p. 228-244.

household sector, where a concerted program of fuel substitution reduced incremental demand for coal (see Natural Gas, below).The rapid increase in production from local mines in the early 1980s allowed the accumulation of large stockpiles of coal; nearly 100 million tons of coal accumulated at minemouths by 1986. Although transport constraints were in part responsible for the stockpiling, planners mistakenly regarded this "surplus" as a sign that the squeeze on coal supplies was easing. By 1989, however, it became evident that demand was outstripping supply, and shortages were being avoided only by drawing down on stocks, which were largely depleted by the end of 1988. The current shortage of electric power, most severe in the coastal regions, is exacerbated by a growing shortage of coal.[5]

The geographical mismatch between coal production and consumption centers has necessitated the transport of hundreds of millions of tons of coal each year. Coal is the single largest commodity carried by China's railroads, accounting for an average 40% of the total volume of shipments throughout the 1980s (Table 5). Nearly 15% of all domestic coal shipments originate in Shanxi province, which in 1988 dispatched more than 122 million tons from central mines alone, and this figure is expected to top 300 million tons by the end of the century. Destinations are less concentrated; eight provinces, all located on China's eastern coast, received more than 10 million tons of centrally allocated coal in 1988, with Liaoning alone taking delivery of 24 million tons.[6] A small, but growing, volume of coal reaches international markets. Major expansions at the northern China ports of Qinhuangdao and Shijiusuo have allowed coal exports to reach 15 million tons in 1989, but numerous officials in the National Coal Corporation question the wisdom of coal exports given the tightness of supply in the domestic market. Coal imports, stable at around 2 million tons a year, are largely the result of barter trade with North Korea, though some specialty coals are imported for industry.

Table 5
Domestic Coal Transport and International Trade
(million tons)

	Domestic Transport				Export	Import
	Total	Rail	Road	Water		
1981	..	424.95	..	..	6.57	1.93
1982	..	450.62	..	..	6.44	2.19
1983	..	473.21	..	..	6.56	2.14
1984	751.64	500.92	159.35	91.37	6.96	2.49
1985	791.23	534.31	159.47	97.45	7.77	2.31
1986	820.89	547.86	167.61	105.42	6.83	1.94
1987	839.67	562.60	164.59	112.48	9.95	1.72
1988	872.37	585.62	162.46	124.29	12.41	1.69
1989	..	..	..	..	15.34	2.29

Note: ..—not available.
Source: *CESY 1989*, p. 370; *China Customs Statistics*.

UPSTREAM OIL

As one of the first sectors of the Chinese economy to open to the outside world, the petroleum industry benefited quickly from access to foreign markets. After falling from a peak of 2.12 million b/d in 1979 to 2.02 million b/d in 1981, onshore production began to rise as new technologies were imported and introduced into the domestic oil fields. At Daqing, the granddaddy of China's oil fields and the source of the bulk of China's crude exports, infill drilling and the widespread use of submersible pumps brought production up to 1.1 million b/d in 1985, peaking at 1.11 million b/d in 1988. Shengli oil field was the big hope of the 1980s, as expanded exploration and improved drilling techniques boosted output by nearly 12% a year from 1980 to 1985. Total output reached nearly 2.5 million b/d in 1985, with growth averaging 5.4% a year since 1981.

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[5] The 1989 shortfall was estimated at 30 million tons. See Jiang Xianrong, Ministry of Energy, "Review of and Outlook for Conservation Work in China," *Zhongguo Nengyuan*, no. 5, 1989, p. 41.

[6] *CESY 1989*, p. 369.

Since 1985, the increases have slowed sharply, and in 1989 total crude output grew a mere 0.4% over 1988. Part of the slowdown was due to the faster-than-expected decline in the Huabei oil field south of Beijing. This so-called "buried hill structure" is not well understood geologically, and its decline by nearly 50% from 1985 to 1989 exceeded even the most pessimistic forecasts. Unfortunately, this oil field is the source of a significant proportion of Beijing's natural gas supply, which may indicate that the plans for expanding gas use in Beijing to displace coal may be set back. Smaller fields, such as Zhongyuan in Henan and Karamay in Xinjiang, have been the main source of expansion outside the main fields, but together with a dozen other small fields contribute only about 20% of total output.

The other big hope for increasing oil production in the 1980s was the offshore areas. In the 10 years since the first Western companies began seismic surveys, the results have been disappointing. In general, the geology has been unfavorable—highly fractured small structures—meaning high costs and low yields. Furthermore, after international oil prices crashed in 1986, Western companies reduced expenditures, and some withdrew altogether. Nevertheless, in 1985, the first joint Sino-Japanese field came onstream in the Bohai, followed by two smaller fields brought on in 1987 and 1989, but total production has reached only 10,000 b/d. The total (France) find in the Beibu Gulf off southern China was first expected to produce up to 20,000 b/d itself, but again geology and technical problems have kept production below 8,000 b/d. In 1990, the Huizhou field, discovered and developed by the ACT (Agip-Chevron-Texaco) consortium, began production, bringing total offshore production to over 20,000 b/d for the first time. This will be followed in 1991 by production from the JHN Lufeng 13-1 field in the Pearl River Basin, which is expected to add 10-15,000 b/d to the total.

DOWNSTREAM OIL

The refining industry as well has undergone a significant transformation in the 1980s.[7] After shutting down a number of small refineries in the early 1980s and consolidating most of the rest under Sinopec—the China National Petrochemical Corporation—in 1983, China embarked on a program of refinery upgrading to reduce the output of fuel oil and increase the output of more valuable products such as gasoline, kerosene, diesel, and petrochemical feedstocks. After some US$10 billion in expenditures, primary distillation capacity has reached 2.4 million b/d—fifth largest in the world—and China now has the highest ratio of upgrading capacity to distillation after the United States (Table 6).

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[7] For further details on the Chinese refining sector, see David Fridley, *From Toppers to Bottoms: a Survey of the Chinese Refining System* (Washington, DC: US Department of Energy), Jan. 1988.

Table 6
Upgrading to Distillation Ratios: International Comparisons, 1989
('000 b/d)

	China*		US		Japan		Indonesia	
	Capacity·	% Dist.	Capacity	% Dist.	Capacity	% Dist.	Capacity	% Dist.
Distillation	2,213	100	15,418	100	4,199	100	714	100
FCC/RCC	685	31	4,749	31	617	15	13	2
Hydrocracking	100	5	1,078	7	153	4	100	14
Thermal#	295	13	1,730	11	86	2	82	11
Reforming	112	5	3,528	23	532	13	62	9
Total Upgrading	1,192	54	11,085	72	1,388	33	256	36

*Sinopec only.
#includes coking, visbreaking, and thermal cracking.
Source: *Oil and Gas Journal*, 26 December 1989; personal communication.

After declining for a few years in the early 1980s, throughput rose only slowly as the export market received preference over the domestic refiners. This policy was changed in 1986, as low international prices, combined with a rising volume of suppressed demand in China, led the government to reallocate more crude to the domestic system. Since 1986, throughput (including non-Sinopec refineries under the China National Oil and Gas Corporation [CNOGC], the former Ministry of Petroleum) has risen an average of more than 100,000 b/d each year; in 1990, total runs are expected to rise a further 90,000–100,000 b/d (Table 7).

Table 7
China's Petroleum Product Output, 1980-89

	1980	1985	1989	1980	1985	1989	Growth, 80-89
	Million tons			Thousand b/d			%
Gasoline	10.8	14.4	20.6	252	335	480	90.5
Kerosene	4.0	4.0	4.0	85	85	85	0.0
Diesel	18.3	19.9	25.7	363	394	509	40.2
Fuel Oil	28.7	28.4	30.2	521	515	548	5.2
Throughput	78.7	84.5	107.2	1,574	1,690	2,144	36.2

Source: Sinopec.

Gasoline output has increased the most rapidly, primarily owing to the overwhelming reliance on catalytic cracking in secondary processing and the high profits from gasoline production. Kerosene production has remained flat in the 1980s, but output of lamp kerosene—which is consumed largely in rural areas and accounts for about one-third of the total—has actually fallen, while jet fuel production has jumped in response to the expansion of the domestic and international airline network. Output of diesel fuel, the mainstay of China's product mix, has risen less dramatically than gasoline, despite burgeoning demand from the agricultural, industrial, and power sectors, and has only slightly outpaced growth in throughput over this period. Since 1988, with diesel imports soaring, there has been a steady reorientation toward maximizing diesel production, and output promises to jump to 600,000 b/d in 1990. Fuel oil output (including the volume used as refinery fuel) has remained nearly flat at about 530,000 b/d, but its yield as a proportion of throughput has fallen from 40% in 1980 to 28% in 1989.[8]

Production of nonenergy-use products has increased significantly as well. Other products—including chemical feedstock, lubricants, asphalt, coke, paraffin, and solvents—now yield over 14% on throughput, with growth in chemical feedstock production paralleling the expansion of ethylene and other petrochemical facilities. Lubricants production has been stagnant in the 1980s; 1990 production of 37,000 b/d is virtually the same as in 1980. Despite good feedstocks from Daqing vacuum gas oil, lube production facilities are relatively simple, and China is still reliant on imported lubricants for many of its modern automobiles and much of its imported machine stock.

Since 1986, consumption of petroleum products has outpaced the rise in refinery throughput. By loosening regulations on imports, China allowed many once-deficit regions to import products for local use. With diesel being in greatest shortage, especially in the developed coastal regions, imports rose dramatically, from near zero in 1985 to over 80,000 b/d in 1989. Guangdong and other coal-short regions in the south have imported fuel oil, while gasoline imports remain for the most part limited to retail outlets in the Special Economic Zones, largely owing to high (85%) custom duties levied on imports for inland delivery.[9] Domestic consumption has also been boosted from a reduction in product exports. Since peaking in 1985, total product exports have fallen by nearly 30,000 b/d, although this decline has been stemmed by surging refinery throughput; exports in 1990 are expected to rise from their 1989 levels. Higher throughput, however, has required the expansion of crude oil imports, despite a 22% drop in crude exports since 1985. The majority of crude imports come from Indonesia—whose heavy waxy crude is very similar to most Chinese grades—and from Oman, which produces a low-sulfur (0.8%) crude suitable for Chinese refineries and yielding larger volumes of much-needed middle distillates. Since 1985, the total shift in China's oil trade has reached 330,000 b/d, equivalent to the total consumption in Thailand in 1989 (Table 8).

Trade with Japan and Singapore dominated in the 1980s. Since establishment of a government-to-government deal for crude exports in the late 1970s, Japan has remained China's largest export market. Although the long-term contract is set at 180,000 b/d until 1991, Japan regularly imports 80,000–100,000 b/d in addition from the spot market, primarily of Daqing. The bulk of Daqing imports, however, are not refined; its low sulfur content makes it a favored crude for direct burning in power plants.

China's exports to Singapore commenced in 1980, but volumes remained below 10,000 b/d until a long-term processing deal for 60,000 b/d was agreed upon in 1984. Within one year, exports for processing in Singapore shct up to over 160,000 b/d, leading to severe downward pressure on the regional price of low-sulfur waxy

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[8] In weight-percent terms.

[9] China National Chemical Import and Export Corporation (Sinochem), personal communication.

Table 8
China's Crude and Product Trade, 1980-89
('000 b/d)

	Exports				Imports			
	Crude	%	Products	%	Crude	%	Products	%
1980	266		84		7		neg.	
1981	275	3.4	92	9.5	1	(85.7)	neg.	
1982	304	10.6	105	14.1	13	1,200.0	neg.	
1983	304	0.0	102	(2.9)	7	(46.2)	neg.	
1984	446	46.7	116	13.7	5	(28.6)	neg.	
1985	623	39.7	124	6.9	0	(100.0)	1	
1986	570	(8.5)	109	(12.1)	9		39	3,800.0
1987	545	(4.4)	99	(9.2)	0	(100.0)	40	2.6
1988	521	(4.4)	96	(3.0)	17		61	52.5
1989	487	(6.5)	95	(1.0)	65	282.4	107	75.4

Note: neg.—negligible.
Source: *CESY 1989*, *China's Customs Statistics*. Before 1985, import and export figures were collected by the Ministry of Foreign Economic Relations and Trade (MOFERT), which recorded trade only within its system. Inconsistencies with Customs figures arise from the MOFERT practice of recording trade based on the date of contract signing, and, in the case of crude, recording as imports crude oil which was actually resold in Singapore. Since 1985, Customs figures have been recognized officially.

resid (LSWR). By increasing the proportion of higher sulfur Shengli crude in the export mix, China reduced the output imbalance, but Singapore was already beginning to lose its significance in China's export strategy. With booming regional oil demand after 1986, Singapore refiners found it more profitable to increase runs of Middle Eastern crudes, and to increase runs on their own accounts. Processing fees, which were once as low as $0.55 per barrel, rose to over $1.30 by late 1989 and early 1990, sharply reducing China's incentive for Singapore processing. Total crude exports to Singapore fell to 70,000 b/d in 1989.

NATURAL GAS

Natural gas production in China began growing in importance with the discovery and exploitation of the vast natural gas fields in Sichuan province. From a mere 290 million m^3 in 1959 (the year the Daqing oilfield was discovered), production jumped to over 1 billion m^3 in 1960—98% of which was nonassociated gas—and nearly tripled again by the beginning of the 1970s. With development of the extensive associated gas reserves in the major oilfields, total production rose to a peak of 14.5 billion m^3 in 1979, after which the industry entered a prolonged period of stagnation. By 1982, production had fallen 18%.

China's natural gas production is small in relation to its potential reserve base and crude oil production. Table 9 compares the major non-OPEC oil and gas producers; China is ranked fourth in oil production but twelfth in natural gas. On an oil-equivalence basis, the ratio of oil and gas production in the United States and the Soviet Union is roughly one-to-one, but in China, gas production totals less than one-tenth of crude output. Natural gas constitutes less than 3% of the national primary energy supply, whereas oil supplies 20%. Nearly all gasfields suffered from the cutback in production in the early 1980s, with the notable exception of the

Zhongyuan field, located in the Yellow River valley in Henan province. Discovered in the late 1970s, Zhongyuan has also become China's fourth largest oil field, surpassing Huabei, which is now in a period of rapid decline. A concerted program of exploration in the Dongpu depression, in which Zhongyuan is located, has increased natural gas reserves at a rate of more than 10 billion m^3 per year, and, on average, every ton of crude oil produced from this area contains 100 m^3 of dissolved gas.[10] In 1988, despite rapid growth, the 1.29 billion m^3 of output from Zhongyuan ranked it fourth in associated gas production after Daqing (2.23 billion m^3), Liaohe (1.64 billion m^3), Shengli (1.42 billion m^3), though it is far larger than the Xinjiang (460 million m^3), Dagang (391 million m^3) and Huabei (209 million m^3) fields.[11]

Table 9
Oil and Gas Production by Major Non-OPEC Countries, 1989

		Oil				Natural Gas (Oil Equiv.)	
		mill. tonnes	'000 b/d			mill. tonnes	'000 b/d
1	USSR	607.5	12,150	1	USSR	644.5	12,890
2	USA	433.8	8,676	2	USA	438.4	8,768
3	Mexico	141.2	2,824	3	Canada	88.2	1,764
4	China	138.3	2,766	4	Netherlands	52.9	1,058
5	United Kingdom	91.9	1838.0	5	Algeria	40.2	804
6	Canada	80.2	1,604	6	United Kingdom	37.9	758
7	Norway	74.9	1,498	7	Norway	28.8	576
8	Libya	54.8	1,096	8	Mexico	23.9	478
9	Algeria	50.4	1,008	9	Argentina	21.6	432
10	Egypt	44.5	890	10	Italy	15.3	306
11	India	34.2	684	11	West Germany	13.6	272
12	Brazil	30.9	618	12	China	12.9	258

Source: *BP Statistical Review of World Energy*, (London: British Petroleum), June 1990.

Sichuan province, location of China's major nonassociated gas fields, is currently the largest natural gas producer and accounts for more than 40% of China's total. Its importance is heightened by the fact that, at 90%, Sichuan has the highest ratio of commercial sales to production and accounts for more than 60% of national sales. Other gas producers such as Daqing, Liaohe, and Shengli consume a significant proportion of their production in oilfield uses. In 1987, for example, total commercial natural gas sales from all oil/gas fields amounted to 8.4 billion m^3, or only 61% of total production of 13.76 billion m^3.[12] At the Daqing field in far northeastern China, where ambient temperatures are often far below the 60 F pour-point of Daqing crude, less that one-third of natural gas production is sold commercially. Much of the gas is used to heat crude for pipeline transportation, while some is reserved for reinjection and for household use by oilfield workers. Nationally, an average 20–30 m^3 of gas is burned per ton of oil transported. Low heater efficiency (about 60% compared to 85% in developed countries) and a lack of natural gas transport facilities lead to high use and waste by fields.[13]

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[10] *Almanac of China's Economy 1987* (Beijing: Economic Management Press), 1987, p. VI-41.
[11] *CESY 1989*, p. 127.
[12] *Almanac of China's Economy 1988*, (Beijing: Economic Management Press), 1988, p. V-21.

Consumption of natural gas is dominated by industry. In 1988, industrial consumption (including oil/gas field use) reached 11.9 billion m^3, or 83% of the total. The balance was consumed by the construction industry (760 million m^3, 5%), household/residential use (1.53 billion m^3, 11%), and transport and other uses (170 million m^3, 1%). Within industry, two-thirds of the commercial volume of natural gas is consumed by fertilizer plants, both as feedstock and fuel. Other major industrial users include the metallurgical and synthetic fiber industries; a declining share of the gas—290 million m^3 in 1988—is used for power generation. Fastest growth has been recorded in residential consumption, which increased from 0.2 billion m^3 in 1980 to 1.53 billion m^3 in 1988. Currently, over 5.3 million people are served by natural gas in the cities of Beijing, Tianjin, Shenyang, Dalian, Zhengzhou, Chengdu, and Chongqing.[14]

ELECTRIC POWER

Electric power has recorded the fastest growth of all energy forms in the 1980s yet remains most seriously in short supply. Development of the industry since 1980 has been characterized by an initial concentration on hydropower development, followed by a sustained effort to expand thermal generation capacity and to replace oil with coal. In 1980, thermal generation accounted for 80% of total output of 300 TWh, falling to 75% in 1983, then rebounding to 81% in the first half of 1990 (Table 10).

Table 10
Power Generation Capacity and Output, 1980-89

	Capacity (MW)			Output (TWh)		
	Thermal	Hydro	Total	Thermal	Hydro	Total
1980	45,549	20.320	65,869	242.4	58.2	300.6
1981	47,203	21,930	69,133	243.8	65.5	309.3
1982	49,400	22,960	72,360	253.3	74.4	327.7
1983	52,280	24,165	76,445	265.0	86.4	351.4
1984	54,517	25,600	80,117	290.2	86.8	377.0
1985	60,638	26,415	87,053	318.3	92.4	410.7
1986	66,277	27,542	93,819	355.1	94.5	449.6
1987	72,710	30,190	102,900	397.3	100.0	497.3
1988	82,800	32,700	115,500	436.0	109.2	545.2
1989	na	na	124,500	462.7	117.1	579.8
Average Annual Growth (%)						
1980-85	5.9	5.4	5.7	5.6	9.7	6.4
1985-89	10.9*	7.4*	9.4	7.4	8.1	7.6

*to 1988.
Note: na—not available.
Source: *CESY 1989*, p. 137.

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[13] Qu Shiyuan and Dong Luying, "Study of the Rational Utilization of China's Natural Gas," *Zhongguo Nengyuan*, No. 3, 1986, p.4.

[14] *CESY 1989*, p. 376. Nearly 10 million people are served by low-BTU town gas from coking plants and gasification plants. In 1988, total own gas consumption reached 1.72 billion m^3, up from 1.37 billion m^3 in 1980. Over 14 million people have access to LPG, consumption of which totalled 1.32 million tons in 1988, equivalent to 1.9 billion m^3 of natural gas.

Thermal power generation has become increasingly reliant on coal. In 1980, coal constituted 82% of total fuel use (coal, oil, and gas), but with the displacement of oil by coal, oil consumption in power generation has fallen from 400,000 b/d in 1980 to 300,000 b/d in 1988, with coal now providing 95% of total fuel supply. [15] This heavy reliance on coal has created logistical and transport problems, as the major thermal power plants are concentrated in the eastern and northeast coastal provinces, while supplies are sourced from the major coal mining regions of interior Shanxi, Inner Mongolia and Shaanxi provinces. Even distant Guangdong province, which has few indigenous energy resources, is heavily reliant on Shanxi coal to fuel its coal-fired plants.

As the industry grew in the 1980s, new and larger generation and transmission facilities were developed. In 1980, the majority of generating units were rated 200 MW or less, but at the end of 1988, China had brought on line two (imported) 600 MW units, and 32 units of 300–350 MW capacity out of a total of 296 units of 100 MW or larger. Units were imported from Japan, France, Italy, the Soviet Union, and Eastern Europe, and these imported plants now account for nearly 20% of total generation capacity. [16] Transmission lines have increased both in length and capacity. From zero in 1980, China now has nearly 6,000 km of 500-kV transmission lines, while the length of 330-kV lines has risen nearly 500% and 220-kV lines have tripled in length to over 65,000 km. Major grids have developed in North China, East China, Central China, and the Northeast.

Nevertheless, electric power shortages have worsened in virtually all parts of the country as growth in power output has averaged only half that of GNP growth. In 1988, China was short an estimated 78 TWh of electricity, or 14% of actual generation, but this number is widely regarded as understated since the estimate was based on minimal needs for industry, agriculture, and transport without consideration of urban and household demand. [17] In certain provinces such as Guangdong, estimates of power shortages range from 25% to 35%. These shortages have resulted in billions of yuan of lost output and have caused considerable inconvenience to urban dwellers, who often find themselves in the dark at least once a day. One indication of the magnitude of the shortage is the ratio of power generation capacity to power consumption capacity as measured in megawatts; in 1982, this ratio stood at 1:2.1 but had grown to 1:2.8 by 1988, compared to a preferred ratio of 1:1.7. [18] Contrary to recent official statements, the much publicized trend of expanded home use of consumer electronics and appliances such as washing machines and refrigerators has had little impact on the worsening power crisis; household consumption capacity remains at less than 10% of the national total and actual consumption at less than 7% of the total. In contrast, industry accounted for over 78% of final consumption in 1988.

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[15] *CESY 1989*, p. 154. Oil use includes direct burning of crude (47,000 b/d in 1988), fuel oil (214,000 b/d) and diesel (39,000 b/d).

[16] Chen Wangxiang, Xie Aidi, China Electric Power Industry Association, "Review the Past, Look to the Future," *Zhongguo Nengyuan*, no. 5, 1989, p. 46.

[17] Xia Meixiu, Ministry of Energy, "Analysis of the Crisis in Quota-Price Electricity," *Zhongguo Nengyuan*, no. 1, 1989, p. 27.

[18] Zheng Gongchang, "The Energy Industry Must Grasp Both the Present and the Long-Term," *Zhongguo Nengyuan*, no. 1, 1989, p. 8.

NUCLEAR

China's nuclear plans have been scaled back considerably from the initial target of 20,000 MW of capacity on line by the year 2000. Current plans include three major goals: first, to have 6,000 MW of capacity completed by 2000; second, to have an additional 6,000 MW under construction by 2000; and third, to bring on line 1,200 MW of capacity each year after 2000. Though of more modest scale than earlier plans, this target as well may be compromised by a lack of financial and technical resources (Table 11).

Table 11
China's Nuclear Power Program

Location	Capacity (MWe)	Type	Vendor	Status
Qinshan 1	300	PWR	Domestic	UC, end 1990
Daya Bay	2x900	PWR	Framatome (reactor); GEC (turbine)	UC, 1992 (1), 1993 (2)
Qinshan 2	2x600	PWR	Domestic; cooperation with Germany	Approved, under negotiation
Liaoning	2x1000	PWR	USSR	Planned, under negotiation
Guangdong	2x900-1000	PWR	na	Planned
Local	300	PWR	Domestic	Under negotiation

Note: UC—under construction.
Source: Lu Yingzhong, Director, Institute of Techno-economics and Energy System Analysis, Beijing, "The Challenges and the Hope: Nuclear Energy in Asia, Status and Prospects," paper presented at the American Nuclear Society Annual Meeting, Nashville, TN, June 10-14, 1990, p. 9.

China's first domestically designed commercial plant—the 300 MW pressurized water reactor (PWR) at Qinshan in Zhejiang province near Shanghai—is scheduled to be synchronized with the East China grid in late 1990 or early 1991, while the first 900 MW unit of the Daya Bay nuclear plant in Guangdong province, is expected to begin generation in 1992, followed by the second 900 MW unit in 1993. Currently, China is considering the construction of a second plant in Guangdong of 1,800-2,000 MW capacity and plans to follow the commissioning of the Qinshan plant with a second employing domestically designed 600 MW units now under development. After the visit of Prime Minister Li Peng to Moscow in 1990, China announced that it would import nuclear technology from the Soviet Union for installation in Liaoning province, which is home to China's highest concentration of industry. This plant would also be of the PWR design and have a total capacity of 2,000 MW. Aimed at solving the serious shortage of electricity in the major coastal industrial areas, nuclear power "bases" are being developed for Guangdong, Liaoning, and the Yangzi River Delta region.

II. CHALLENGES IN THE ENERGY SECTOR

The partial nature of the economic reforms in the 1980s have put China's energy industries in a classic "squeeze." Controls on many elements of cost to the industries—such as material prices, interest rates, and wages—were loosened considerably, while output prices remained fixed by the government. This squeeze is a major cause of the deterioration of the industries' performance in the latter part of the 1980s, but it has coincided with a number of other developments which present immense challenges to industry revitalization.

PRICING, COSTS, AND FINANCIAL PERFORMANCE

Energy pricing policy in China has been based primarily on the provision of low-cost energy to the industrial sector. With the broadening of economic reforms in the 1980s, pricing became a central issue in the reform of the energy industries. The major development during this period was the adoption of "double-track" pricing, which involved the establishment of a higher price—usually 2 to 3 times higher—for oil, coal, natural gas, and electric power produced above planned or contracted levels or produced from collective or private mines and plants. The intent of this reform was to promote marginal production, since producers were able to sell the above-quota amounts directly to end users without guidance from state plans. The effects of this policy were quite pronounced in the early and mid-1980s, but rising production costs and falling profits have wiped out many of the early gains (Table 12).

Table 12
Costs Increases and Losses in the Energy Sector*, 1980-88

	Change in Costs (%)				Total Reported Losses (million yuan)			
	Oil/Gas	Refining	Coal	Power	Oil/Gas	Refining	Coal	Power
1981	5.93	na	(5.68)	2.40	na			
1982	7.87	na	(2.08)	6.87				
1983	2.95	na	(1.03)	5.38				
1984	2.05	na	4.67	5.95				
1985	10.12	na	22.25	6.47	1	1	1,571	123
1986	9.90	1.88	8.03	8.69	18	9	2,218	213
1987	4.21	2.27	4.67	7.73	199	1	2,624	270
1988	21.86	13.84	14.16	13.20	1,142	2	3,011	709

*state-owned independent accounting units only.
Source: State Statistical Bureau, *China Statistical Yearbook*, various years.

The oil industry was among the first to adopt the two-tiered pricing system. The price of the oil produced within the state plan (quota oil) remained at the Y100 per ton level set in the 1970s, while above-quota production was set at the *yuan* equivalent of international prices prevailing in 1982. Daqing crude, for example, was priced at Y650 per ton ($45/bbl). [19] Petroleum products also received new above-quota prices, although essential fuels such as diesel and fuel oil remained heavily subsidized.

The new pricing system played an important role in the rapid expansion of onshore oil production in the early 1980s, and it created a favorable environment for the development of offshore deposits. Price reform in other sectors of the economy, however, has created unexpected pressures on the industry. Deregulation in other sectors such as steel, cement, machinery, and other basic construction materials led to a surge in their prices, forcing oil production costs up at an unprecedented rate. At the same time, the industry faced an average 20% per year increase in the price of imported equipment, compounded by frequent devaluations of the yuan before 1986. In 1980, crude production costs averaged Y44 per ton but by 1988 had reached nearly Y100, or the price received for each ton of quota crude production.[20]

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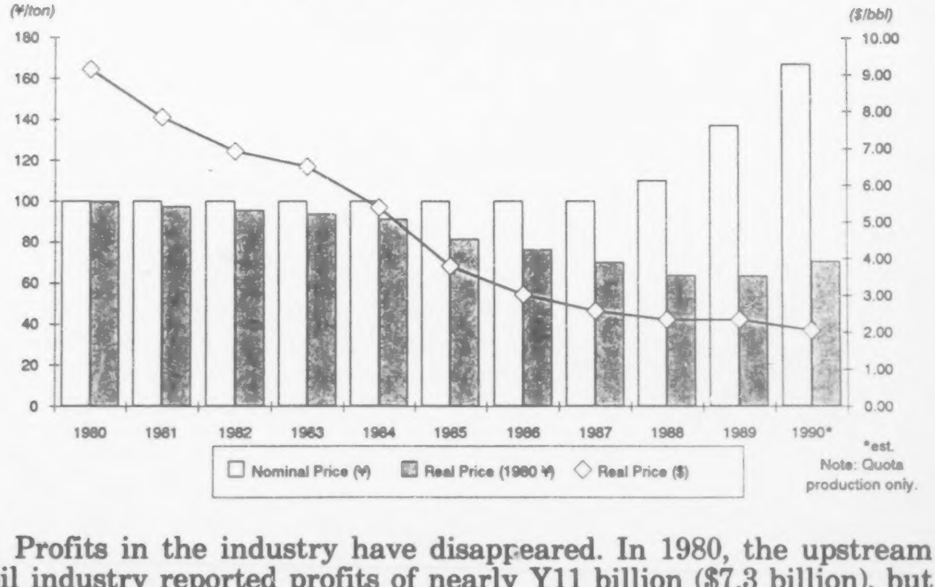
[19] Yuan-to-US dollar conversions are based on the period average exchange rate of the year in question.

Changes in the international market also had an unfavorable impact. With the collapse in international prices in 1986, the domestic above-quota price (for Daqing crude) was lowered to Y545 per ton ($21/bbl), resulting in a sharp drop in income from above-quota production. Even with a slight increase to Y555 per ton in 1989, currency devaluation has brought the dollar-equivalent value down to only $16.15 per barrel.

To fund its operations in the 1980s, the petroleum industry amassed huge amounts of debt, which by the end of 1989 totaled nearly Y20 billion ($5.4 billion), half of which was in the form of foreign loans mostly denominated in Japanese yen. Amortized over production, debt has reached over Y145 per ton, or over $4.00 a barrel. With crude priced at Y100 per ton, rising debt raised the specter of insolvency for the industry, and the government faced a ballooning subsidy burden. In January 1988, the official price was finally raised to Y110 per ton ($4.07/bbl), and further to Y137 ($5.07/bbl) in January 1989. In January 1990, it was hiked to Y167 per ton ($4.85/bbl), but this did not even make up for the devaluation in December 1989, much less account for the more than 20% inflation in 1989 (Figure 1).

Figure 1
Domestic Price of Chinese Crude Oil, 1980-90



*est.
Note: Quota production only.

Profits in the industry have disappeared. In 1980, the upstream oil industry reported profits of nearly Y11 billion ($7.3 billion), but in 1989, total losses in the industry (before offsetting subsidies) reached Y3.9 billion ($1.05 billion). The petroleum industry has found itself increasingly short of money to fund further exploration and development work, potentially crippling future output increases from the mature Eastern fields. This is particularly relevant in the 1990s as the government hopes to begin full development of the potentially massive reserves in the Tarim basin, which would involve billions of dollars of expense in building a pipeline to bring the oil east.

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[20] *Zhongguo Nengyuan*, no. 5, 1989, p. 63.

In the downstream sector, prices have affected both the type and degree of upgrading in Chinese refineries. The price differential between light and heavy products—which determines in part a refiner's incentive to upgrade fuel oil—reached as high as $23/bbl in the early 1980s, but has since fallen to around $15/bbl; in Singapore, this differential has averaged $5/bbl over this same period. Combined with a large differential between gasoline and diesel (now $6.30/bbl compared to an average $2.00/bbl in Singapore), these pricing signals have shaped the refining system into a strongly gasoline-oriented system. Price distortions also exist among various grades of the same product and have reduced incentives to upgrade quality. Current policy is to raise the average octane of gasoline from a low 83 RON to 92 RON, but with only $1.50/bbl differential between these grades, compared to some $2.50 in Singapore, refiners have generally forgone the added costs of higher quality. Similarly, shortages of low-pour (±20 C) diesel fuel affect northern China every winter, but since the ±20 grade is priced the same as ±10 grade, and is only $1.30/bbl higher than the 0 grade, refiners are reluctant to absorb the extra cost, despite the economic losses caused by the shortages.

Sinopec has also suffered the effects of rising input costs and controlled output prices. After jumping rapidly in the years after its formation, profit growth has slowed sharply. In 1985, profits were up 48% over the previous year, but the rise slowed to about 14% in 1986 and 1987, and was reduced to only 2% in 1988. With sagging domestic demand yet continued higher prices in 1989, Sinopec suffered an 11% fall in profits; already, virtually every simple refinery and many complex refineries have reported losses.[21] In Chinese parlance, these are "policy losses," the result of unfavorable state policies on pricing and other financial matters, though there are many indications that many Chinese refineries would not be competitive at international price levels.

Foreign loans have been as critical in the expansion of the refining industry as in upstream development. A wide range of modern refining equipment was imported in the 1980s, including hydrocrackers, visbreakers, alkylation units, resid cat crackers, and reformers, even though China has a domestically produced version of nearly all of these technologies. Petrochemical expansion also added to Sinopec's total debt burden. Four major ethylene-centered petrochemical complexes—at Daqing, Qilu, Yangzi, and Shanghai--opened during the decade, raising total ethylene capacity from 500,000 to 1.8 million tons. Seven years of foreign borrowing has brought Sinopec's total foreign debt to $6 billion (out of China's total of some $45 billion), repayment of which begins in 1990 and peaks in 1994. This repayment burden is additional to Sinopec's requirement of about $1 billion per year for upgrading current units and expanding existing refineries.

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[21] *Sinopec Annual Report 1989.*

One of the most serious obstacles to the revitalization of China's natural gas industry is the long-term impact of low prices. For most of the past decade, costs in the gasfields have been higher than the sales price, which is set by the state on a field-to-field basis. Between 1985 to 1987 alone, the national average sales price of natural gas per 1000 m^3 rose from Y59.07 to Y68.47, while the average sales cost per 1000 m^3 increased from Y74.30 to Y99.28, resulting in soaring losses.[22] The seriousness of the situation moved the State Council to raise prices in April 1987, when the Ministry of Petroleum Industry (now CNOGC) and the State Council signed a contract raising the price of the first 6.5 billion m^3 of natural gas to Y130 per thousand m^3 ($0.99 per thousand ft^3), up from the previous price range of Y50–Y80 per thousand m^3 ($0.38–$0.61 per thousand ft^3). In parallel with the two-tiered pricing system in effect in the oil industry, the above-quota volume of natural gas was to be sold at double the new price. This price rise allowed some producers to make a marginal profit, though high-cost gas fields such as Huabei were already incurring sales costs in excess of Y200 per 1000 m^3 in 1987.

Costs of natural gas production rose sharply as production conditions deteriorated. Large increases in field maintenance and major repairs have become necessary at fields in the middle or late stages of their production lifespan, but often these costs have been concealed to keep accounting costs low. At some fields, expenditures on such items as field maintenance, exploration in current producing areas, depreciation, bonuses and welfare allowances, and other nonoperational expenditures have either been omitted or only partially recorded in accounts (Table 13). Producers have responded to the state policy on subsidization which stipulates no additional subsidy for excessive losses over the "loss quota" (set by the state), and retention of surplus subsidies by the fields for losses below quota. As a result, fields have tried to make their costs look as small as possible to have more subsidized money at their disposal.

As a perennial loss-maker, the coal industry has also eroded its productive capacity as losses have become unmanageable. In 1980, production costs averaged Y20.05 per ton—lower than the minemouth price of Y21.33. After eight years of rapidly rising prices, production costs nearly doubled to Y39.97 per ton, while the average sales price reached only Y27.94; in 1988 alone, 93% of central mines reported losses totaling Y3.011 billion. From 1984 to 1988 alone, central mines spent a total of Y6.063 billion to make up for financial shortfalls, including Y3.779 billion originally targeted for production development and technical renovation, Y2.063 billion of repair and maintenance funds, and Y206 million of salary funds, seriously affecting technical preparedness and workers' incomes.[23]

In contrast to central mines, local and village mines are able to sell their output either at market prices or within a price ceiling

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[22] "Low Prices Are a Serious Obstacle to Development of the Natural Gas Industry," *Tianranqi Gongye* (*Natural Gas Industry*), no. 5, 1989, p.3.

[23] Chi Chu, China National Coal Corp., "A Review of Ten Years of Reform and Development in the Coal Industry," *Zhongguo Nengyuan*, no. 5, p. 19.

Table 13
Reported and Unreported Costs in the Natural Gas Industry, 1985-87
(million ¥)

		1985	1986	1987
I. Depreciation/major repair	a. Actual costs	280	220	250
	b. Listed costs	120	140	130
	c. Difference	160	80	120
II. Field maintenance	a. Actual costs	620	670	780
	b. Listed costs	200	210	220
	c. Difference	420	460	560
III. Unreported exploration in producing areas		660	530	560
Subtotal (Ic+IIc+III)		1,240	1,070	1,300
Adjusted complete costs		1,860	1,870	2,050
Percentage of unreported costs		66	57	63

Source: *Tianranqi Gongye (Natural Gas Industry)*, No. 5, 1989, p. 7.

set by the provincial price bureau. Facing lower production costs as well, many mines are able to make a profit, but these profits have been falling as local governments have adopted a series of special "land-use" and other fund-raising taxes. Dependent on these local and collective mines to boost national output, the government has been reluctant to force the implementation of numerous regulations on mine safety and modernization, as they would raise the low start-up and operating costs of these mines; currently, large central mines require an average Y300–500 of investment per ton of new capacity, while local mines average Y150–160 and village mines only Y75–80.[24]

The electric power sector has suffered a gradual erosion of profits during the 1980s. Recognizing the inadequacy of central funding for this capital-intensive industry, the government in July 1984 tacked on a Y0.02/kWh consumer surcharge for a dedicated Electric Power Construction Fund, but at the same time raised the tax on the production and sale of electric power from 15% to 25%, including a Y10/MWh charge on producers and a 10% revenue tax on distributors.[25] These measures, combined with a steady rise in costs of construction materials and fuel, had a strongly negative impact on the profits of thermal-power plants, especially oil-fired ones (Tables 14, 15).

The July 1984 regulations also permitted construction of new plants by enterprises, localities, collectives, and individuals. Following the principle of "whoever invests has ownership and receives the benefits," the government allowed the price of electric power from these plants to be set at a higher, negotiated price (*yi jia*), but it also meant that the owners themselves as consumers faced higher electricity prices. This has resulted in an unintended disincentive for enterprises to invest in power plant construction, since they are otherwise able to petition for the provision of quota-priced

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[24] Di Fangsi, Ministry of Energy, "My Views on Accelerating the Development of the Local Coal Mining Industry," *Zhongguo Nengyuan*, no. 1, 1989, p. 31.

[25] Xia Meixiu, Ministry of Energy, "Analysis of the Crisis in Quota-Priced Electricity," *Zhongguo Nengyuan*, no. 1, 1989, p. 26.

Table 14
Fuel Costs in Power Generation, 1980-87
(¥/ton of coal equivalent)

	Coal	Oil	Average
1980	36.68	69.74	46.14
1981	40.39	71.82	47.71
1982	43.25	99.20	55.40
1983	47.89	115.40	61.32
1984	53.15	116.46	64.10
1985	59.77	112.33	69.21
1986	67.04	130.68	75.21
1987	72.42	134.90	79.46
Avg. Ann'l Increase (%)	10.2	9.9	8.1

Source: Xia Meixiu, *Zhongguo Nengyuan*, no. 1, 1989, p. 25.

Table 15
Electricity Prices, Costs, Taxes, and Profits, 1980-87
(¥/MWh)

	Sale Price	Sales Cost			Taxes	Profits
		Total	Fuel	Depreciation		
1980	64.79	32.38	17.06	5.46	9.69	22.72
1981	65.05	33.49	17.31	5.89	9.72	22.35
1982	66.13	35.59	19.19	6.03	9.69	20.85
1983	67.16	37.47	20.31	6.04	9.64	20.05
1984	68.96	39.75	21.50	6.14	11.04	18.17
1985	70.85	42.95	22.88	6.24	15.59	12.21
1986	75.26	47.66	25.03	6.67	16.09	11.43
1987	78.66	52.82	na	na	16.16	9.48
Avg. Ann'l Increase (%)	2.8	7.2			7.6	(11.7)

Source: Xia Meixiu, *ibid.*, p. 27.

electricity at less than half the cost of their own power.[26] The severe shortage of electricity, especially after 1984, has led a number of regions to seek additional electricity at virtually any cost. Since 1985, hundreds of sets of diesel-power generators have been imported, primarily in the south and eastern coastal regions. Powered by diesel fuel (most of which is imported), these generators have provided guaranteed supplies of electricity to hotels, office buildings, and factories, but at a cost of up to Y0.50/kWh, compared to the basic tariff of Y0.0745/kWh for large industrial users and Y0.0912/kWh for other industrial and commercial establishments.

Although the power industry as a whole remains profitable, the return on capital has fallen from 12% in 1980 to less than 4% in 1988. With normal bank loans charging 7.2% interest, new power plants are almost all running at a financial loss and banks have become increasingly unwilling to fund new ventures. Until 1989, most of the debate on energy price reform concerned the need to raise prices, increase the role of market-based floating pricing, and move eventually to international price levels. The severe inflation of 1988 and 1989, combined with a partial return to central planning, has caused much of this earlier debate to be replaced by an emphasis on the controlled pricing system, quotas on losses, and cumbersome formulas to be used for price adjustment.[27] Discarding many tenets of market pricing theory, planners have called for a continuation of the dual-price system and a rise in quota-priced energy to a level guaranteeing each sector an average return on capital no less than the national industrial average. For virtually every sector, this would involve a doubling or tripling of prices, but would still leave most energy prices substantially below international levels. The natural gas industry, for example, has proposed a price rise to around Y175 per thousand m^3 ($1.35 per thousand ft^3), providing the industry with an overall profit, but still leaving a number of major gasfields in the red.

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[26] Xia Meixiu, *ibid.*, p. 28.

INVESTMENT

A major development in energy investment in the 1980s has been the move away from state allocation of investment capital at no interest to a combination of financing channels including bank loans; retained profits; special conversion funds; local financing; floating of enterprise, city, and provincial energy bonds; and foreign loans and foreign joint ventures (Figure 2). In 1981, central-budget investment accounted for 66% of total investment in the energy sectors, dropping to only 27% in 1988.[28] Other major sources of funding, including domestic bank loans, foreign borrowing, and self-financing, have grown at over 25% per year during this period, but each sector has developed a different degree of reliance on each financing source. The coal industry, for example, still relies heavily on state investment, but has accounted for only 15% of domestic bank loans to the energy sector. In contrast, bank loans to the oil industry—including offshore development—have accounted for only 4% of total bank loans, whereas the sector accounts for nearly 50% of all foreign exchange loans. The power industry dominates the use of domestic bank loans and self-financed investments, and has managed to raise over Y7 billion in other sources, including local, enterprise, and private investment. It has also led the industry in the variety of foreign financing sources; since 1981, the power sector has received loans from the World Bank, Japan External Cooperation Fund, Kuwait, and credits from a number of national export-import banks (Table 16). Investment in the energy industries is widely regarded as inadequate. Averaging only 14%-15% of total investment in the 1980s, funding to the sector has been vastly exceeded by investment in energy-consuming ventures. The Ministry of Energy has called for a rise in the investment ratio to 20%-23% of the total, with the proportion dedicated to the electric power industry increased to 9%-10%, as is typical in many industrialized countries.[29]

The shift from central funding to a reliance on loans and retained profits has generally worsened the financial position of the

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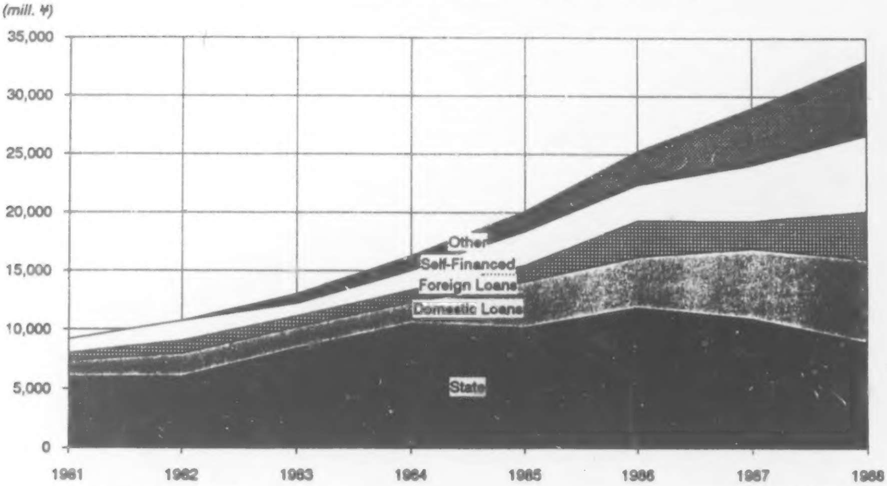
[27] See the annex to Document 1071 (1989) of the Ministry of Energy on "Several Policy Suggestions Concerning Support for Development of the Energy Industry," reprinted in *Zhongguo Nengyuan*, no. 1, 1990, pp. 18–23.

[28] *CESY 1989*, p. 29.

[29] Ministry of Energy, Document 1071 (1989), *op. cit.*, p. 19.

Figure 2
Investment in Energy Industries* by Source, 1981-88



*excluding nuclear industry.

Source: same as Table 16.

Table 16
Fixed Asset Investment*
(billion ¥)

	Total Investment	Energy	Energy as % Total	Coal	Oil/Gas	Electric Power	Refining	Coking & Town Gas
1981	96.10	14.20	14.8	3.63	4.69	4.78	0.74	0.36
1982	123.04	17.41	14.2	4.87	6.20	5.53	0.70	0.11
1983	143.01	21.34	14.9	6.21	7.42	6.91	0.65	0.15
1984	183.29	27.91	15.2	8.19	9.46	8.90	0.99	0.37
1985	254.32	36.84	14.5	8.80	13.03	12.73	1.21	1.07
1986	301.96	44.77	14.8	9.31	13.78	18.42	1.63	1.63
1987	364.09	55.00	15.1	9.94	16.62	24.08	2.64	1.72
1988	449.65	65.29	14.5	10.80	19.70	28.58	4.21	2.00

*including public, collective, and private investment.
Source: *CESY 1989*, p. 21.

energy industries. The coal, natural gas, and upstream oil industries have had to resort to using other funds earmarked for repair, maintenance, and exploration to fund shortfalls in construction and operating expenses. The increase in bank loans has added to total industry debt, but there has been little tax relief from the central government, and in many cases tax rates have risen. In 1984, for example, the electric power industry changed from profit remittance to a taxation system. Under this system, profits remaining after debt repayment on investment loans (converted from earlier state allocations) are subject to a 55% income tax; the balance is then subject to a 28.5% "adjustment" tax, leaving the enterprise with less than 10% of its original earned profits. These profits are then divided according to a state-set formula among development, preparedness, social security, and employee bonus funds. Between 1985 and 1988, the power industry paid Y1.83 billion more in taxes to the government than it received in public investment.[30]

As a primarily military-oriented sector, the nuclear industry has remained outside direct state investment channels. At present, much of the investment capital for the industry depends on an annual contribution of 3.5 million tons of "dedicated oil" (gongxian you) from CNOGC, worth about Y800 million, although financing of the Daya Bay nuclear plant in Guangdong has involved domestic and foreign bank loans, including state-guaranteed foreign exchange loans. As a way to stimulate the development of the industry, the State Council has issued a circular calling for the incorporation of the nuclear industry into the Ministry of Energy, subject to its overall planning, financing, and management, and to list the nuclear budget for the Eighth Five-Year Plan as "nonoperational" expenses, relieving the first few domestic nuclear plants from debt repayment burdens.[31] Nevertheless, the needed investment for conversion of military plants to civilian production, treatment of nuclear waste, environmental protection, and repair and maintenance is expected to exceed central government capabilities; as a result, the industry has also promoted the involvement of provincial and local governments and enterprises in nuclear-related development.

PRODUCTIVITY AND EFFICIENCY

The need for higher production in the face of limited capital has highlighted the importance of productivity in increasing unit energy output. As with many sectors of the Chinese economy, the energy industries suffer from high rates of waste, low utilization, and numerous inefficiencies in production, transport, conversion, and consumption. Although productivity in the energy industries was enhanced by a number of reform policies in the 1980s, reversals began to appear after 1985 as investment slowed, costs rose, and limits to current production techniques were reached. Geological factors as well exacerbated the turnaround.

In the oil industry, the high rate of oilfield use and loss declined steadily in the early 1980s. At a number of fields, crude was used as fuel to heat crude for pipeline transportation and to generate power but has since been largely replaced by natural gas or coal. Between 1980 and 1984, oilfield use of crude fell by 11% but rose 16% between 1984 and 1988 as more crude was consumed in fueling enhanced recovery processes. The program of enhanced recovery has also increased oilfield losses. In 1988, production losses and oil field self-use together reached 3.6% of total output, or nearly 100,000 b/d. With further development of marginal fields, this percentage is expected to continue to rise.

The oil industry has also suffered from a sharp drop in well productivity. Although the number of oil wells in production has more than doubled since 1981, average output has dropped from nearly 100 b/d to just over 60 b/d. Part of this is due to the increased use of infill drilling to maximize total output from field complexes such as Daqing, but it is mainly due to the declining proportion of flowing wells, which now account for only 10% of the total.[32] With artificial lift—meaning water flooding, steam flooding, and pumping—incremental yields are smaller and costs higher than with wells flowing under natural pressure. This decline in productivity is also reflected in rising unit costs of capital investment in the oil industry. By 1985, average costs for development of one barrel per day of production capacity had fallen to 6,520Y (in 1980Y); in the three years to 1988, this figure doubled in real terms to Y13,065 per b/d, or Y24,100 per b/d in current money. With a 40% fall in the average output per well from 1980 to 1988, higher investment was needed simply to maintain output.

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[30] Chen Wangxiang et al., *op. cit.*, p. 47.

[31] Jiang Xinxiong, China Nuclear Industry Corporation, "Accelerate the Development of China's Nuclear Industry," *Zhongguo Nengyuan*, no. 6, 1989, p. 12.

The electric power industry has seen a number of its efficiency and productivity measures rise over the past decade, although the rate of improvement has slowed significantly. The industry is generally plagued by high unit fuel consumption and low conversion efficiencies. In China, fuel costs account for an average 50–55% of power industry operating costs. In 1980, an average 413 grams of coal-equivalent fuel was consumed for each kWh of power generated; renovation measures and the installation of newer equipment quickly brought the rate down to 398 grams by 1984, but it had fallen only 1 gram further by 1988. Unit fuel consumption varies widely around the country depending on the configuration of the installed capacity, ranging from a high of 485 gce/kWh in Hunan to only 338 gce/kWh in Beijing, compared to an average 328 gce/kWh in the Soviet Union.[33] Each gram decline in China's consumption rate equates to a savings of over 400,000 tons of coal, but further improvements are hampered by the proliferation of small (25 MW or less) locally built power plants, built in an attempt to find a quick solution to worsening power shortages. Energy consumption in these plants ranges up to 1,000 gce/kWh, pollution measures are minimal, and operating costs more than double that of an average 200 MW plant, but they can be designed and built in only one-half to one-third the time; for many counties, these plants are the only way to increase the local supply of electricity. Between 1985 and 1988, total capacity of these plants grew from 15,000 MW to 22,000 MW, accounting for about one-quarter of total thermal generation capacity.[34]

Low utilization and overstaffing depress productivity measures. Most 1,000 MW plants in China have 2,000 to 3,000 workers, compared to only 500 in a 700 MW plant built by Huaneng International in Dalian. Many plants suffer derating as a result of the high ash content of the coal burned; these problems in turn reduce the number of operating hours per year, in some cases to as few as 3,000 hours. In contrast, newly built plants average some 6,000 hours of operation annually.[35]

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[32] *World Oil*, January 1990, p. 28.

[33] Jiang Xianrong, Ministry of Energy, "Review and Outlook of Energy Conservation Work in China," *Zhongguo Nengyuan*, no. 5, 1989, p. 40.

[34] Ye Qing, State Planning Commission, "Report to the State Council on the Fifth Energy Conservation Working Group Meeting," *Zhongguo engyuan*, no. 5, 1989, p. 6.

[35] Huang Yicheng, Minister of Energy, "Thoroughly Undertake Adjustment in the Energy Industries, Increase Labor Productivity and Economic Returns," speech to National Energy Working Meeting of 5 January 1990, reprinted in *Zhongguo Nengyuan*, no. 1, 1990, p. 5.

Nearly 16% of power generated in China is lost before reaching the consumer. Thermal power station use has risen slowly to nearly 8% of total generation, but line losses, though declining slightly, were still a hefty 8.2% in 1988. Although low transmission voltage contributes to the high rate of line loss, in some areas such as Guangdong, theft from line-tapping adds significantly to the overall total.

The coal industry has struggled to improve its performance over the past decade. Overall productivity (i.e. of total employees, including non-miners) rose to 1.092 tons of coal per worker-shift in 1988, only 0.2 tons higher than in 1968; 30% of the coal bureaus under central control average less than 1 ton per worker-shift. The mechanization rate of central-run mines has increased to a nominal 58%, accounting for about 25% of national output, but over half of the 400-plus sets of integrated mining equipment now in use are past their useful lives.[36] Low mechanization and overstaffing at mines contribute to the high percentage of output consumed by the mines themselves. In 1988, mine use accounted for 4% of total output, but at a number of major mines the rate is as high as 10%–15%; at Yantai, it has reached 55%. In contrast, British mines consume an average 0.45% of their output.[37]

Besides the mines, the coal industry is handicapped by a lack of washing plants. In 1988, 175 million tons of coal—only 18% of total production—was washed, but cleaned coal averaged 10% ash, compared to only 2%–3% ash in coal from U.S. or Australian plants. Most of the washed coal is directed to the coking industry, leaving power plant and other industrial consumers with raw coal containing an average 18% ash. With over 585 million tons of coal transported by rail in 1988, this percentage translates into roughly 100 million tons of dirt and other nonvolatile matter carried by the overloaded rail transport system.

Declining real prices, rising taxes and production costs, spiraling losses, high debt burden, insufficient investment, low productivity and low efficiency are among the major problems facing China's energy industries. Problems in management structure, environmental pollution, technology development, and ownership have also been examined by the leadership, but few solutions have been forthcoming. Without a major overhaul of the way the energy industries are financed, operated, and managed, these problems will present an almost insurmountable hurdle which will increasingly frustrate the government's plans for economic modernization.

III. OUTLOOK

Over the next decade, China's energy industries will face immense challenges in meeting the energy requirements of an expanding economy. In 1979, a long-term energy strategy was formulated to support the quadrupling of gross industrial and agricultural output by the year 2000. By assuming a primary energy elasticity of demand of no less than 0.5 and no less than 1 for electric power, the quadrupling of economic activity could be supported by a doubling of primary energy production and a quadrupling of electric power output. Moreover, an implicit assumption was that China could remain energy self-sufficient; domestic production targets were thus set to achieve this long-range goal. Output targets for 2000 were set at 200 million tons (4 million b/d) of crude oil, 1.43 billion tons of coal, 30 billion m^3 of natural gas, and 1,200 TWh of electricity, including 240 TWh of hydropower and 20 TWh of nuclear power. Based on 1989 output, these targets imply an annual average rate of growth for the remainder of the century of 3.5% for crude oil, 2.9% for coal, 6.8% for hydropower, and 6.6% for natural gas, or 3.3% for total energy production.

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[36] Huang Yicheng, *ibid.*, p. 3.

[37] Jiang Xianrong, *op. cit.*, p. 40.

The progress over the last decade has brought achievement of these production targets within reach, but only if the government can reverse the unfavorable trends in investment, productivity, and finances that have worsened considerably since 1985. Major commitments to sustain investment flows, increase efficiency, rationalize prices, promote exploration, stress conservation, and improve the financial situation of each sector are now of vital importance. Measures in these areas could arrest or reverse the slowdown in output growth experienced in the latter half of the 1980s.

Major projects currently under way in the "energy base" of Inner Mongolia, Shanxi, Shaanxi, western Hebei, and Ningxia—including a number of large-scale opencast mines—are expected to boost coal output in this region to 700–800 million tons by 2000, relieving the pressure on local and village mines to sustain as rapid growth as in the past decade. Crucial for success of this plan is the expansion of transport facilities, since 400–500 million tons of coal will need to be transported out of the region by the end of the decade. Since nearly half of this volume constitutes coal for power plant use, pressure has been growing for the government to undertake a program of mine-mouth power plant construction and transmit power to consumption centers. In response, the government in mid-1990 ordered a speed-up in construction of 8,700 MW of coal-fired capacity at the Huolinhe, Yiminhe, Yuanbaoshan, Zhungeer, and Dongsheng mines in Inner Mongolia.[38] Throughout the entire northern "energy base" region, current plans call for a total of 120,000 MW of coal-based thermal capacity to be built over the next 20 years, though environmental degradation, lack of water resources, and insufficient funding remain major obstacles to its realization.[39]

Nationally, over 45,000 MW of new power generation capacity is currently being planned or under construction. Major additions of more than 3,000 MW are slated for the developed eastern provinces of Anhui, Jiangsu, Shanghai (including Shidongkou, China's largest thermal plant of 3,600 MW total capacity), and Zhejiang; the heavily industrialized province of Liaoning and neighboring Jilin; and the rapidly growing province of Guangdong in the south. A similar amount of capacity will be needed in the latter part of the 1990s to reach the target capacity of 175,000 MW in 2000.

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[38] "Acceleration of Construction of Five Large Coal-Power Bases in Inner Mongolia," *Renmin Ribao*, 23 May 1990, p. 1.

[39] Peng Fangchun, State Planning Commission, "Important Measures to Ameliorate the Current Power Shortage," *Zhongguo Nengyuan*, no. 6, 1989, p. 33.

Hydropower production will be boosted by the addition of more than 30,000 MW of capacity, including major additions in Sichuan, Yunnan, Guangxi, Gansu, and Qinghai, and output is likely to achieve the target of 240 TWh in 2000 assuming investment funds remain adequate. With the squeeze in central funding, provincial governments have become more directly involved in construction projects: recently, Yunnan, Guangxi, and Guangdong set up a joint investment organization to accelerate construction of a series of dams on the Hong Shui (Red River), which, when completed some time after 2000, will provide an additional 11,000 MW of capacity. Prospects for the production of nuclear power will depend as well on the ability to channel additional resources into this sector, but assuming at least 5,000 MW of capacity by 2000 (i.e. Daya Bay, Qinshan I and II, and Liaoning), total output could reach 27 to 30 TWh.

Both the oil and natural gas industry, however, are unlikely to meet their production targets. With over half of China's gas production in the form of associated gas, declines in the major eastern fields will result in declines in gas production as well. Without a concerted effort in exploration, onshore gas production is unlikely to exceed 20 billion m^3 by the end of the century, 10 billion m^3 less than the target. A major variable is offshore natural gas; already, CNOOC considers natural gas to have a more promising future than oil in its offshore fields, and it hopes to exploit the estimated 3 trillion m^3 of reserves in the South China Sea, Beibu Gulf, and Pearl River basins. Given the independent financial status of CNOOC, large-scale exploitation of offshore gas resources is unlikely without state backing and funding; indeed, CNOOC has proposed incorporating its gas exploration and production plans into the central budget for the Eighth Five-Year Plan period. Without centrally backed funding, however, only the ARCO find off Hainan island is likely to be brought into production in the next decade, but the bulk of its output may be exported to Japan in the form of LNG to provide foreign exchange.

A shortfall in oil production poses a major challenge. With few substitutes for its use as a transport fuel and petrochemical feedstock—and little leeway for further substitution of fuel oil by coal—oil provides a critical and valuable source of energy to the Chinese economy. Diesel fuel is the primary commercial energy used in agriculture, and—unlike most other countries—gasoline fuels over 80% of China's trucking fleet. Oil is also a major earner of foreign exchange, providing over $3.6 billion in export revenues in 1989, down from a peak of $6.7 billion in 1985. Most of these earnings have come from the export of crude oil, production of which has consistently exceeded the capacity of the refining system. Since 1986, however, refining capacity has expanded rapidly, and throughput has risen at an average of over 100,000 b/d each year, compared to an average 63,000 b/d annual increase in crude production—and a mere 11,000 b/d increase in 1989. Although Sinopec targets 4 million b/d of refining capacity in 2000, equal to projected crude production, neither is likely to exceed 3.4 to 3.5 million b/d (see Table 18, below). Declining or stagnating production at eastern fields such as Daqing, Huabei, Dagang, and Zhongyuan may offset expected increases at Shengli and Liaohe, while exploitation of the estimated large reserves in the Tarim Basin of western China faces severe financial and logistical constraints, not the least of which is the construction of a multibillion-dollar pipeline to bring the crude east to the refining and consuming centers.

Implicit in many of the discussions on production prospects is the assumption that China will remain largely self-sufficient in energy, with "demand" in 2000 equaling production. For certain energy forms, such as electricity and natural gas, this identity is likely to hold, since neither is easily imported. Recent demand forecasts, however, have attempted to separate the concept of demand from consumption and provide estimates of demand based on energy requirements of projected economic activity (Table 17). Concerned with primary energy demand, these forecasts do not provide estimates of total final electricity demand, but given current shortages and the expectation that power demand growth will exceed growth in primary energy production, it is highly probable that total electricity supply will continue to lag demand. Indeed, China's economy is likely to continue to suffer from chronic shortages of virtually every energy type. This prospect has underlaid the recent stress on energy conservation, increased productivity, and "comprehensive utilization" of resources, all policies designed to take advantage of the immense latent energy potential in China's largely energy-inefficient economy.[40]

Table 17
Energy Demand Forecasts*, 2000

	Total (million tce)	Coal (million tons)	Oil (million b/d)	Natural Gas (billion m³)	Hydro (TWh)	Nuclear (TWh)
Range	1,416-1,540	1,329-1,531	2.8-4.8	9.8-50	239-286	0-44.8
Average	1,478	1,465	3.94	33	260	20

*Summary of five forecasts: Energy Research Institute (1987, 1989), Qinghua University (1987, 1990), and the World Bank (1985).
Source: *Zhongguo Nengyuan*, no. 3, 1987; no. 6, 1989; Lu Yingzhong, *Comparison of Energy Consumption, Supply, and Policy of the People's Republic of China and Some Other Developing Countries* (Washington, DC: Washington Institute for Values in Public Policy), 1990.

Shortfalls in coal production in 2000 could take two forms: shortages of coal for power generation, thus exacerbating power shortages, and shortages of coal for industrial uses. Assuming coal demand of 1.4 to 1.5 billion tons, the supply gap may reach some 70 to 170 million tons (or 50 to 130 million tons on an import-equivalent basis). Although China is not prepared to undertake large-scale imports of coal—and indeed still promotes coal exports to compensate for declining oil exports—coal shortages in the resource-poor southern provinces may well be solved through imports from Vietnam, Indonesia, or Australia. Other regions may need to adopt other measures, such as rationing fuel, freeing up household coal consumption through substitution by gas or electricity, strict conservation measures, or limits on industrial expansion.

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[40] Although these policies were first promoted at the Eleventh Party Congress in 1980, they were heard with decreasing frequency over the ensuing decade. Since 1981, there has been an annual meeting of the Energy Conservation Working Group of the State Council, but no meeting was held in 1988. With Prime Minister Li Peng's stress on energy conservation at the Seventh National People's Congress, the group was reconvened in June 1989, and the reports reemphasized the need to give priority to energy conservation in the near term.

China is presently a net oil exporter, but the slowdown in domestic production and rapidly rising demand will transform it into a net oil importer, perhaps as soon as mid-decade. Based on a number of assumptions on output, refinery expansion, and demand, Table 18 presents an alternative forecast for China's supply and demand balance to 2000, with the attendant implications for trade. On the crude production side, financial difficulties, declining production at onshore fields, and marginal output from offshore fields will likely limit output growth to some 3.2 to 3.5 million b/d—the narrower range here reflecting the geological fundamentals involved—while demand, though subject to manipulation by the government through ration and import controls, may reach 3.5 to 4.5 million b/d. Though the high production/low demand scenario for 2000 appears to be in basic balance, the critical variable in relating production to demand is refining. In even the most optimistic projection—requiring that China build a 100,000 b/d grassroots refinery every year between now and 2000—a shortfall in refinery capacity will limit product output to a band centered around 3 million b/d. As a result, total import demand for products could soar from the current 100,000 b/d to over 500,000 b/d, or even to nearly 1.7 million b/d with lower production and higher demand. Similarly, rapid expansion of China's refining capacity, combined with lower growth in crude output, could also place China in the market for over 500,000 b/d of crude.

Table 18
Outlook for Petroleum Supply and Demand
('000 b/d)

	1980	1988	1989	1990			1995			2000		
				Low		High	Low		High	Low		High
CRUDE SUPPLY												
Onshore:												
Daqing	1,030	1,114	1,110	1,090	—	1,100	900	—	1,000			
Shengli	352	666	667	680	—	700	800	—	900			
Others	737	946	956	990	—	969	1,161	—	1,099			
Offshore:	0	15	19	20	—	24	60	—	100	75	—	140
Total:	2,119	2,741	2,752	2,780	—	2,793	2,920	—	3,100	3,150	—	3,510
DEMAND	1,472	1,937	2,053		2,156		2,860	—	3,140	3,540	—	4,480
REFINERY OUTPUT	1,556	1,975	2,041		2,148		2,450	—	2,590	2,800	—	3,320
IMPORTS												
Crude	0	17	64	100	—	120	0	—	200	0	—	510
Products	0	61	107	90	—	100	270	—	740	220	—	1,690
EXPORTS												
Crude	266	545	488	440	—	490	50	—	370	0	—	390
Products	84	99	95	90	—	110	0	—	50	0	—	0

Source: East-West Center.

These volumes, though massively larger than those at present, are not particularly high for a country the size of China, nor are imports historically unprecendented. In the "worst-case" scenario of China importing 1.7 million b/d of products, imports would constitute some 40% of total demand, a level last seen in 1960. Nevertheless, the absolute volume involved is unprecedented, and imports of this magnitude may pose a problem for China's balance of payments. Assuming China's total exports double by 2000 to around $100 billion, lower levels of imports of some 500,000 b/d would account for only 6–7% of total export revenues, up from the current 2.5%, but in the high case of 1.7 million b/d, imports would require around 20% of total export income. The latter figure is most likely unsustainable, since China also faces a higher import bill for foodstuffs, minerals, other raw materials as well as equipment to modernize its aging industrial base.

Nor does China have much leeway to limit oil demand as it did in the 1970s and early 1980s. With fewer than 300,000 private automobiles out of a motor vehicle fleet of over 4.5 million, there is little discretionary driving, and petrochemical feedstocks, demand for which is expected to exceed 320,000 b/d by 2000, form the basis of the rapidly expanding synthetic fibers, plastics, and rubber industries. Currently, textile exports (including synthetics) constitute China's largest source of foreign exchange earnings. In addition, the decentralization of procurement has allowed cities and provinces with foreign exchange surpluses to import oil directly, largely bypassing the limitations imposed by the national plan.

Demand growth will not stop in 2000. By 2020, total energy demand is expected to top 2.4 billion tce (33 million bdoe), including 1.6 billion tons of coal, while the long-range forecast for 2050 posits a demand of 5.2 billion tce (73 million bdoe), including over 3.1 billion tons of coal—equivalent to twice current U.S. energy consumption and about 40% of current world energy consumption. Although little credence should be paid to such forecasts, they do illustrate that China cannot afford to slacken its efforts in expanding energy output, increasing the efficiency of energy use, promoting conservation, and developing alternative energy sources. Moreover, the worldwide concern over the environmental impact of fossil fuel burning poses an even greater dilemma: though blessed with abundant coal reserves, China may face the need to restrict its use in order to limit CO_2 emissions. None of the forecasts to date, however, have factored in this issue, but China appears to have little flexibility in the short term in moving away from its heavy dependence on coal.

Conservation is likely to provide fewer returns than in the past. The record of conservation in the 1980s has been impressive, but estimates of total energy conserved since 1980 range from 250 million tce (based on changing energy intensities in GNP) to 1.1 billion tce (based on changing energy intensities in U.S. dollar terms and the import of energy intensive products such as fertilizers and rolled steel). As with many other indicators, the rate of savings has declined since 1985, averaging 4.7% per year from 1981 to 1985, and only 3.1% per year since then.[41] This decline is in part due to a decline in conservation investment, which fell to Y1.3 billion in 1989 from over Y2 billion in the mid-1980s. Moreover, the cost of conservation has risen significantly, from an average Y300 per ton saved during 1981–1985 to over Y500 per ton in 1986–1989.[42]

Largely ignored in most discussions of China's energy future is the role of noncommercial energy in rural areas. Estimated at about 28% of the volume of commercial energy, noncommericial sources provide over 80% of energy use in the countryside.[43] Split 38% to 61% between wood and agricultural wastes, noncommercial fuels provide energy for heating, lighting, and cooking, but the lack of alternatives has led to serious ecological damage in certain regions from overcutting, diversion of wastes from composting and soil enhancement, and overuse of fertilizers and pesticides. Current policy promotes the development of small-scale hydroplants, provides long-term low-interest loans for energy projects, stresses the use of local resources, and allows greater flexibility in pricing, but solutions are often cast in terms of a long-term 100-year strategy, effectively admitting that in the near-term, little can be done to substantially change the situation in rural areas.

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[41] *CESY 1989*, p. 11.

[42] Ye Qing, *op. cit.*, p. 6.

IV. CONCLUSION

After a decade of remarkable expansion and modernization, China's energy industries are entering a new decade that promises to pose even greater challenges than those met in the 1980s. Financial, economic, and political instability all have a direct effect on the health and vitality of the industry through their impact on budgeting, price reform, industrial restructuring, demand, and trade. The record of economic reform in the 1980s has demonstrated that the Chinese respond rapidly to new opportunities, reflected in the take-off of a number of sectors such as agriculture that had previously been moribund. The economy has also responded well to changes in the international environment—witness the rapid adjustment of foreign trade to lower oil export revenues after 1986. Nevertheless, the current return to reliance on central planning to solve the problems generated by the partial reforms of the last few years does not bode well for the energy industries.

As is the case in all centrally planned economies, central planners do not have access to nor can they process the amount of information needed to run an entire national economy efficiently. Politicization of the process also interferes with optimum allocation of resources and can actually create long-term damage to certain sectors, as seen in the underdeveloped and problem-plagued state of the natural gas industry. Moreover, the information that planners do receive is not always of best quality, since the system often contains incentives to distort production and financial figures, which in turn give the central planners a distorted picture of investment productivity.

Without true markets to provide and process the information needed by the energy-producing and consuming sectors, little sustained improvement in the current situation can be expected. Although raising prices alone would significantly alleviate the industry's financial crisis, problems of compartmentalism and isolation, centralization of planning, bureaucratic and political dominance, and insufficient capital are serious obstacles to revitalization of all energy sectors. Moreover, a conceptual obstacle to price reform is the traditional assertion by central planners that China needs to keep its raw material prices low in order to maintain export competitiveness. Unfortunately, the leading role of productivity in export competitiveness is often lost in this debate, despite the glaringly obvious examples from raw-material-short Japan, Korea, and Taiwan.

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[43] Lu Yingzhong, *Comparison of Energy Consumption, Supply and Policy of the People's Republic of China and Some Other Developing Countries*, p. 31.

Reforms are needed. The multiple salutary effects of price reform are widely recognized, but this should be accompanied by decentralization of planning and enhancement of local flexibility; adoption of standard accounting and costing methods; rationalization of the tax regime; liberalization of trade, including the broadening of import rights; and further deregulation at the retail level, among other policies which would help ultimately to reverse many of the unfavorable trends that have emerged over the last decade of stop-and-go partial reform. As the world's third largest producer and consumer of energy, it is in more than China's own interest that its domestic industry remain healthy and capable of providing for the needs of its economy and population.

China also faces serious challenges internationally. Rising imports of crude oil and petroleum products raise the question of how and where to access the required volumes. China now depends primarily on Singapore for its product imports, but even with complete dedication to the China market, Singapore would be unable to supply a sufficient amount of products if import demand rises at its current rate over the next decade. A large product deficit may provide an opening to greater foreign participation in the downstream sector, which to date has been limited to technology sales, engineering contracts, product sales, and retailing in the Special Economic Zones. Foreign-backed joint ventures in refining would bring to China the marketing and technical expertise of the international oil companies along with a lessened reliance on product imports.

The reforms needed in the energy sector would compel a host of related legal and economic reforms. Without them—or even with some of them—China is likely to be left with an increasingly limited number of options in the 1990s as the imbalance between energy supply and demand grows. The experience of the 1980s has shown that the current situation is counter-productive and most likely unsustainable, but it has also demonstrated that industry can and will respond to new incentives and policies. It is critical, however, that these incentives provide the proper signals to producers and consumers. With such a fundamental commodity as energy, China must ensure that it enters the twenty-first century with a healthy and vital industry.

C. Science and Technology

OVERVIEW

By Genevieve Knezo *

Multiple contradictions consistently hamper China's science and technology modernization. China's early technological preeminence—for instance, in printing, gunpowder and armaments, the use of wind and water power to drive machines, porcelain, and cast iron—predated European discoveries by four to ten centuries. But European technology eventually dwarfed these achievements because of the inertia of Chinese cultural orthodoxy, which sapped creativity; population pressures, which reduced China's need to use technology to increase industrial productivity; corruption; and bureaucratic mismanagement. Similar constraints curb China's science and technology today.

Of the "four modernizations" announced by China in 1978, clearly the most important was the goal, later down-scaled, of reaching technological parity with the West by the year 2000. The current belief is that the development of science and technology will not only augment the productivity of China's abundant manpower, but will enable China to develop the industrial and agricultural capabilities and defense base needed to help forge a modern economy.

China has achieved some success. Richard Suttmeier reports that it has the largest scientific and technological infrastructure (including personnel) of any developing country and that it has geographically dispersed its scientific and technical resources. Leo Orleans describes the world class scientific caliber of Chinese students and scholars now in the United States, who are overqualified to work in China's science and technology infrastructure and whose return to China might adversely affect the work of U.S. laboratories.

The 1985 decision of the Communist Party Central Committee to emphasize applied science and technology in order to drive economic growth deemphasized basic research and forced more cooperation between researchers, industrial firms, and entrepreneurs. Institutes involved in R&D under the Chinese Academy of Sciences are now required to supplement the funding they receive from the State by contracting work with individual enterprises.

Suttmeier cites as effective the Chinese Government-directed "863" National High Technology Development Program, which

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Papers not mentioned in this overview were not available to the reviewer at the time this was drafted.

gives priority to biotechnology, space technology, information technology, laser technology, automation technology, energy, and advanced materials. This program also aims to divert some military technology research resources to the civilian sector.

China's space program began in the 1960s with military support, and continued at modest levels during the Cultural Revolution because of Zhou Enlai's personal endorsement. Civilian activities seem to be paramount now. Marcia Smith concludes that despite China's economic problems, the U.S. restrictions on technology transfer, and the lack of a cooperative U.S.-Chinese space agreement, China is now considered a world class space power with 27 successful launches of its own or foreign-owned satellites (telecommunications, weather, resources, reconnaissance).

Suttmeier and Eric Baark discuss the decentralized, but government-managed, technology promotion programs. The Spark Program was formulated in 1985 by the State Science and Technology Commission (SSTC) to develop more middle- and high-technology enterprises and to train technical workers in the rural areas. This was followed in 1988 by the Torch Program, to accelerate the commercialization of research results generated in national institutes. The government encouraged the creation of "start-up" firms and "technology incubators" in existing special economic zones and in new high-technology development zones that give firms preferential tax treatment and access to foreign exchange. Under the Torch Program, the government finances priority projects in electronics, information, and new materials. The *minban* program consists of non-State run science parks and some private industrial firms that entrepreneurs have "spun off" from State-funded research institutes whose government-guaranteed funds were cut. They generally have some form of collective ownership and a relationship with the district government. One often-cited success story is the Haidian district in Beijing, an area known as "electronics street." Suttmeier estimates there are 894 such firms located in at least 30 cities.

Notwithstanding these successes, most of the authors cite major obstacles to China's science and technology reform. Baark assesses the various "policy cultures" in Chinese society—bureaucratic, entrepreneurial and academic—that generate inertia which constrains innovation and reform. Pressures to maintain centralized party and bureaucratic control over the political and social order, or at least over the speed and direction of reform, need to be reconciled with the growing independence and dispersion of power that accompany scientific and technological modernization. This dilemma is seen in the attenuation of the technological goals set out originally by leaders Deng Xiaoping, Hu Yaobang, and Zhao Ziyang and opposed by conservative party elements because they implied unacceptable levels of social and political freedom and the introduction of "contaminating" Western ideas. The government's attitude was manifested in its violent suppression of student demonstrations for democracy in June 1989.

Conservatives continue to try to maintain a command economy over the decentralized initiatives, and Soviet-trained science and technology bureaucrats continue to oppose policy reforms that link the innovative capacities of economy to the "mainstream of productive activity." The party's role in the industrial economy has been reinforced by China's need to curb inflation stemming from recent relaxations of some of the austerity measures imposed on the economy in the late 1980s and the shortage of local financing for industrial activity. Centralized party control continues to limit the development of the non-State economy and China's access to high-technology joint ventures and foreign capital. Baark and Suttmeier believe that the current political uncertainty and uneasy climate for business following the Tiananmen demonstrations will further depress technological reforms.

The momentum of scientific and technological modernization often clashes with the "traditional Chinese" way of doing things. This involves such practical issues as determining the balance between foreign and domestic sources of technology and the degree of freedom to give to intellectuals. In this regard, Suttmeier describes the need to placate the children of the old guard, the elite families who now control technological firms, and to induce them to invest in nonmilitary commercial ventures. Uncertainty about the ownership of intellectual property rights also undermines China's high-technology future and foreign high-technology trade. Baark contends that fraud permeates the growth of direct contacts between researchers and the nascent businesses that came with decentralization. He says the SSTC's regulatory reforms—the Patent Law of 1985, the Technology Contract Law of 1987, and the organizations created to manage markets—have increased centralized bureaucratic control. Suttmeier contends that China's commitment to maintaining its socialist system will deter innovation, risk taking, and creativity.

Historically, China opposed the import of Western knowledge, but now an external orientation is condoned, especially since 1978, when a decision was made to send foreign students abroad to supplement the deficient knowledge base of the "old scientific elite," who had been trained in the West prior to the Communist revolution or in the Soviet Union. Orleans focuses on "brain drain" issues and on the approximately 50,000 Chinese students and scholars who are currently in the United States. Over the years China has accepted some loss of young professionals as an acceptable cost of training students abroad, but brain drain has been getting larger because China cannot absorb all its trained personnel. Orleans and Mary Bullock conclude that it is in the best interests of both China and the West to solve the problem of student defection.

The flow of students abroad did not abate following the Tiananmen disaster despite the Chinese government's imposition of requirements for students to undergo political education and to reimburse the government for their preparatory education. Numerous exceptions are made for those who have private funding from relatives abroad or who can bribe or buy their way out. Also foreigners have continued to be receptive to Chinese students.

Bullock notes that following the Tiananmen incident and the imposition of martial law, the foreign intellectual community has been torn between sustaining or canceling programs with China. Those advocating continuity argued that the Chinese intellectual community would become more vulnerable and isolated if outside ties further diminished. Those advocating suspension hoped to influence, by protest and sanctions, more ameliorative government policies."

For the most part, however, most of the papers in this section conclude that there is a continuity of relationships. China wants to maintain its open door to the West and to seek international markets for its products. The West seeks to promote China's development for both commercial and strategic reasons. According to Bullock, the harshest reaction to the crackdown was from American scientists. The U.S. Government sent mixed signals, with some agencies continuing to maintain contacts and renew cooperative agreements despite bans on high-level negotiations and travel advisories. The United States has even once again temporarily extended the umbrella Science and Technology accord, which expired in January 1987. The major obstacle to renewal is disagreement over intellectual property rights, not Presidential human rights policies regarding Tiananmen.

There is, however, some evidence of weaker ties with the West. Chinese government action to suppress democracy damaged West European ties with China, and, according to Bullock, Europe is now more interested in ties to Eastern Europe. Overall, "As West Europe, Japan and the United States begin to renew or extend their scientific and technical agreements with China, it is apparent that they are seeking less technologically advanced fields for cooperation because they link international relationships to political reform in China. Environmental science rather than robotics, for example, will be given priority."

Bullock also foresees a significantly enhanced role for Japan in China—a factor that may realign power relationships in the Pacific. Initially there was some slowdown in student exchanges and Japanese financial assistance, but "Japanese political leaders and academics alike also maintained that Japan had a special (more realistic) understanding of China and that China should not become internationally isolated." Bullock reports that since June 1989, Sino-Japanese science and technology cooperative activities have more than doubled and Japanese funding has been expanded to include more technical assistance, educational relations, and economic assistance.

Whether China will achieve its technological reform by the year 2000 is debatable. What is clear is that China's present leaders do not want to sacrifice party ideology, Chinese traditions, and existing power alignments to modernization. Apparently, Western leaders have little choice but to respect this orientation.

FRAGMENTED INNOVATION: CHINA'S SCIENCE AND TECHNOLOGY POLICY REFORMS IN RETROSPECT [1]

By Erik Baark *

CONTENTS

	Page
Summary	531
I. Historical Framework	532
II. Policy Culture Tensions	535
III. Commercialization and Entrepreneurship	539
A. Commercialization: The Technology Markets	539
B. Entrepreneurship: Science and Technology Firms	542
IV. Conclusions	544

FIGURES

1. Science and Technology Policy Measures of the 1980s	534
2. Science and Technology Policy Cultures: A Matrix	535
3. Examples of Policy Instruments for Each Policy Culture	536
4. Policy Instruments in the Innovation Process	537
5. The Value of Technology Trade, 1985–87	540
6. Electronics Street: Number of Firms and Turnover	543

SUMMARY

The aim of reforms [1] in China's science and technology (S&T) policy and management during the 1980s was to provide a new impetus for a substantially different pace and performance level for technological innovation. The analysis proposed in this paper suggests that this objective has not been fully achieved. The fate of the reforms has been shaped by what I refer to as the tensions between policy cultures on the one hand and the inertial forces of Chinese society on the other, both of which act to constrain innovation.

I identify three S&T policy cultures: bureaucratic, entrepreneurial, and academic. Each of these cultures has been associated with particular development priorities, a set of preferred policy instruments, and represents a particular "network" of political and institutional interests. Reformers of a fundamentally entrepreneurial outlook struggled in the early 1980s to integrate innovation and production by means of new, market-oriented organizations. Failing to overcome the resistance of a middle-aged, Soviet-trained network of administrators and the rehabilitated academic elite, how-

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[1] Research for this paper has been conducted with financial support from the Swedish Agency for Research Cooperation with Developing Countries. In addition, I am greatly indebted to Andrew Jamison for criticism and suggestions, and to many Chinese friends for assistance in the collection of relevant material. The responsibility for views presented in the paper is, however, completely my own.

ever, these reformers had to accept compromises in the late 1980s which deprived them of a good deal of their influence over the basic resources for technological innovation in the Chinese society. As a result, the innovative capabilities of China's economic system remain fragmented, i.e. separated from the mainstream of productive activity. The difficulties in establishing the new technology markets promoting technological entrepreneurship illustrate the continuing problem of fragmentation. The concluding section of the paper discusses the forces of fragmentation in the context of the new imperatives of technological modernization in the 1990s.

I. Historical Framework

The reforms in China in the 1980s must be seen in the perspective of that nation's modernization endeavor. Three important goals have been to find a balance between foreign and domestic sources of technology, create adequate technological capabilities to meet perceived defense needs, and satisfy the nationalist urge to "catch up" with the advanced industrialized countries.

These concerns were superimposed on a science and technology system that had, since the founding of the People's Republic of China, sought to integrate science into "socialist reconstruction." This process had generated its own particular set of issues with the establishment of a range of indigenous organizations for research and development. The core questions concerned the role of science and technology—and, by extension, the practitioners: scientists, engineers, and technicians—in China's modernization.

It is useful to distinguish between two fundamental issues. One issue pertains to the question of intellectual autonomy of scientists—or freedom of expression. The leadership wished to ensure the "correct" ideological consciousness and allegiance to the political priorities of the Chinese Communist Party, while scientists have often upheld traditions of intellectual and academic freedom. Another issue has been concerned with the manage ment of science and technology and thus centered around the professional or institutional autonomy of scientists. Here the key question has been whether and to what extent scientific research and technological development should be directed by central planning and resource allocation. In addition, the issue of professional autonomy has become increasingly concerned with questions of research funding and debates over management approaches.[2]

The first three decades of policy debate were dominated by the conflict over intellectual autonomy in which there were two fundamental rival policy viewpoints, the "ideologist" and the "neutralist." The ideologist view emphasized the class interests of the proletariat, endorsed and articulated by the Party, as a guideline for research and development. It was felt that the propagation of communist political consciousness among scientists would enable them to conduct science relevant to the people and to the nation. Those who were ideologically biased in "capitalist" directions would not be motivated to produce such results. The first serious attempt to implement this view came during the Anti-Rightist Campaign and the "Hundred Flowers" campaign in the late 1950s. The Cultural Revolution in the late 1960s and its aftermath represented another radical effort to exercise intellectual control as a means of directing S&T. This effort also failed to achieve much more than a disruptive effect on the development of science and technology.

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[2] For an illuminating discussion of the struggle for autonomy by Chinese scientists, see Richard P. Suttmeier, "Reform, Modernization, and the Changing Constitution of Science in China" *Asian Survey*, Vol. 29, No. 10 (October 1989), pp. 999–1015.

The neutralist viewpoint, in contrast, argued that ideology was largely irrelevant to the production of scientific and technological results. In a socialist system of centralized planning the influence of the Party should be limited to establishing the priorities for the system as a whole; only the main guidelines of development needed to be selected at the top political echelons with due reference to the political goals of the Party. Deng Xiaoping's aphorism that it does not matter whether the cat is black or white as long as it catches mice, which was so strongly attacked by the Cultural Revolution radicals in the early 1970s, epitomized the pragmatism espoused by the neutralist view. The neutralist view dominated the S&T policy debate in the early 1960s and has been the official principle underlying reforms since 1978. The turning point came when Deng Xiaoping made the crucial announcement that scientists belonged to the working people and thus needed no extra ideological schooling. In reality, however, the ideological castigation of intellectuals recurred at regular intervals during the 1980s. The rhetoric concerning criticism of "bourgeois liberalization" and the necessity of Party leadership forced upon the scientific community after the crackdown in June 1989 indicates that the influence of an ideologist policy view is dormant, but far from dead.

China entered the 1980s under the domination of a neutralist policy perspective to meet the twin challenges of revitalizing an alienated and weak scientific and technological infrastructure and "catching up" with the industrialized countries. The legacy of the past—regardless of the conflicts between the neutralist and ideologist viewpoints—was a strongly regimented pattern of S&T management. This pattern had evolved from copying the Soviet, Stalinist model during the "golden years" of S&T planning in the 1950s. Key components of this system were the central research organizations such as the Academy of Sciences, the comprehensive system of military and sectoral research and development institutes, and the concentration of research and development resources to specific, defense-oriented projects.

The system failed to provide a significantly higher technological level in the majority of industrial enterprises. Apparently less than 10 percent of the results of research and development activities was put into production in the 1970s, and the designs of the vast majority of equipment dated from the 1950s. Chinese and foreign observers agreed that it would require an enormous effort to raise the level of technology to those current in the industrialized countries. The new reform measures of the 1980s were seen as a solution to this problem; in Figure 1 some of the most important are briefly described.[3]

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[3] A detailed description of the whole range of S&T reforms and their implementation is beyond the limits of this paper. A fairly recent overview is provided in Denis F. Simon and

Continued

FIGURE 1. SCIENCE AND TECHNOLOGY POLICY MEASURES OF THE 1980S.

Technology markets	It became possible to sell the results of research and development, which had previously been transferred without any compensation. Most commercial transactions since 1981 have taken place at local or national technology fairs
Technological transformation	Upgrading the technological level of equipment in state-owned enterprises. This program was initiated in 1982. It was implemented by the State Economic Commission and has involved both import of technology and domestic innovation activities
Key breakthrough S&T projects	Since 1982 the State Planning Commision (SPC) has formulated key breakthrough projects under the five-year plans. The projects are inceasingly open to tenders from competing research institutions
Patent system	Patent Law promulgated 1985. Introduced as a complement to S&T awards in order to provide incentives for the discovery and dissemination of new technology
Open Laboratories	Key laboratories equipped with advanced instruments have been established in various fields by the SPC since 1985. The laboratories should receive both domestic and foreign guest researchers
S&T Firms	Promotion of new research, development and production ventures. These may be established jointly by research and production units or may be independently operated by entrepreneurial units
Spark Program	In order to diffuse new technology in the countryside, the SSTC initiated this plan in 1985. It involves demonstration projects and major training programs. Funding is envisaged to come from both government and local sources
Funding reform	Since 1986 government allocation of funds for operating expenses were reduced for research units engaged in applied research and development, since these units were expected to raise financial resources on the technology market
Appointment system	New regulations for professional appointments issued in 1986 in order to create opportunities for mobility of scientific and technical personnel
National Science Foundation	Established in 1986 to support basic science research acccording to criteria of academic exellence
High Technology Plan	A large number of research projects announced in March 1986 to support new industries in microelectronics, biotechnology, new materials, space, etc.
Torch Program	A series of projects initiated since 1988 to ensure the development and diffusion of results from the High Technology Plan. Projects are approved by the SPC but funding is to be raised locally
Science Parks	Experimental zones set up since 1988 to provide special incentives to high technology industries

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Merle Goldman (eds.), *Science and Technology in Post-Mao China* (Harvard University Press, Cambridge, Mass., 1989). Another useful source of information is the series of White Papers on S&T that the Chinese have published in recent years. They are entitled *Zhongguo kexue jishu zhengce zhinan (Guide to China's Science and Technology Policy)* and have been published by the State Science and Technology Commission (SSTC) annually for 1986 to 1989.

II. Policy Culture Tensions

In the course of the 1980s, three different "policy cultures" have emerged within the neutralist framework to provide guidelines for reform. They may be classified as bureaucratic, entrepreneurial, and academic (see Figure 2). While in practice they often become intertwined in the process of policymaking, for analytical purposes it is useful to separate them as "ideal types." They exist primarily as interest lobbies, or institutional networks, and as such exercise significant influence over practical policymaking.

The process of reform during the 1980s can be said to have started at the level of development priorities and then moved gradually "down" to the more pragmatic issues of choosing the means by which to implement these priorities. At a later stage, these issues were further transformed into the conflicts and compromises of institutional power struggle.

FIGURE 2. Science and Technology Policy Cultures: A Matrix.

	Policy Culture		
	Bureaucratic	Entrepreneurial	Academic
Development priorities	National needs	Market demand	Knowledge frontiers
Policy instruments	Planning guidelines	Commercial transactions	Peer review
Institutional networks	Planning and Economic Commission/ Defense S&T and Industry Commission	Science and Technology Commission	Chinese Academy of Science/ Universities

The initial challenge to the previously hegemonic bureaucratic policy culture came with the acceptance of market-oriented reforms at the Third Plenum in December 1978. The focus of development priorities shifted away from "national needs" defined primarily by the military-industrial complex. A report prepared by the State Science and Technology Commission (SSTC) in 1981 proposed to coordinate S&T priorities more closely with economic development, although it still operated largely within the framework of administrative plans. The document did, however, provide preliminary designs for new policy instruments; experiments with technology markets, opportunities for technical consultancy, and eventually the establish ment of new firms thus proliferated in the first half of the decade. Interestingly, research institutes in the defense sector had pioneered some of the new approaches, but they were quickly superseded by a large number of civilian research institutions.

The endorsement of the reforms by the CCP Central Committee came in March 1985 in its "Decision on the Reform of the Science and Technology Management System." Ironically, this took place as the bureaucratic policy culture reasserted its influence after a few years of alleged economic "overheating." The market-oriented policy instruments formulated by the entrepreneurial reformers also mobilized academic resistance to the reforms, since they forced the large majority of research institutes to look for new sources of financial support.

In practical terms, the tensions among policy cultures seriously limited the effectiveness of the range of policy initiatives taken. These initiatives formed a spectrum ranging from an emphasis on planning and centralized decision-making to the free search for scientific results, illustrated by some examples in Figure 3. The identification of particular initiatives with the different policy cultures is only approximate since many compromises were made in the process of policy-making.

FIGURE 3. EXAMPLES OF POLICY INSTRUMENTS FOR EACH POLICY CULTURE.

Bureaucratic	Entrepreneurial	Academic
* Technological transformation program	* Technology markets	* Open laboratories
* Key S&T projects (Five-year plan)	* Patent system/ S&T laws	* National Science Foundation
* High technology plan	* S&T Firms, Science Parks	* Appointment system
	* Spark and Torch Programs	

For example, both the Spark Program and the Torch Program have been seen as a means of decentralizing decision-making by the transfer of funding responsibilities to local authorities. Nevertheless, the shortage of local funds has made it very difficult to implement these programs without the assistance of the bureaucracy. The setting of priorities for the Spark Program has largely been the responsibility of the SSTC, and thus the program tends to combine the planning approach with the promotion of entrepreneurial initiatives.

Other compromises emerged between the bureaucratic and the academic policy cultures. The establishment of open laboratories and the High-Technology Program was based on criteria of academic excellence, and has provided an important means to strengthen advanced fundamental research in China.[4] In the process of actual implementation of these schemes, however, the influence of the State Planning Commission has tended to shift priorities in the direction of applied research. In the case of technology markets and entrepreneurship, as we shall see below, the pervasive influence of the bureaucratic culture has also forced the entrepreneurial reformers into compromises regarding the regulation of innovative activities.

The bureaucratic and the entrepreneurial cultures have shared an interest in the promotion of technological development and diffusion. In the 1980s there has thus been a significant shift in policy concern along the innovation cycle, from measures designed to promote invention to measures intended to enhance the diffusion of technologies. Earlier the academic and bureaucratic policy cultures had been preoccupied with the earliest phases of the innovation process. The entrepreneurial reformers have tried to direct more attention to—and generate more funds for—the later phases of the process, as delineated in Figure 4.

FIGURE 4. POLICY INSTRUMENTS IN THE INNOVATION PROCESS.

Discovery	Development	Diffusion
Science Foundation	Key S&T Projects	Spark Program
S&T Awards	High Technology Programme	Torch Program
	Patent System	Technological Transformation Programme

This shift has reflected the demand-side orientation of the entrepreneurial policy culture, and has been viewed as an important step in making the S&T system more responsive to the needs of the economy. The new approach also created a greater need for ensuring that the new measures had internal consistency and that support was provided throughout the innovation process. The conflicting priorities of each policy culture have reduced the actual possibilities for integration. The bureaucratic and academic cultures, in particular, entail a legacy of concepts that perceives of innovation as a supply-oriented, one-way flow from research units to production enterprises. Such concepts inhibit the potential of the majority of Chinese policymakers to see and, to an even greater extent, support and exploit the crucial forward and backward linkages that characterize modern innovation processes. Even the integration of the High-Technology Program and the Torch Program has tended to ignore the potential contribution of feedback linkages with production enterprises.

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[4] For a recent overview, see Marc Abramson, "Open Labs in China," *China Exchange News* Vol. 18, No. 1, pp.8–13.

In addition, there has been a tendency for institutional interest lobbies to develop separate networks struggling for ultimate power over financial resources. The entrepreneurial reformers attempted to create a network around progressive political personalities in the CCP Central Committee, the State Council, and the recently abolished Science and Technology Leading Group. The entrepreneurial network was thus based on an unusual alliance between high-level politicians such as Hu Yaobang and Zhao Ziyang, who had become opposed to the rigid Soviet model through their largely domestic experience, and an expanding group of young technocrats inspired by Western economic and managerial philosophies. A stronghold of this network was the SSTC, but the influential research organizations known as "think tanks" established by Zhao Ziyang have also played a major role.

In the early 1980s these people were on the offensive supported by the crucial, but ambivalent, personal charisma of Deng Xiaoping. Since the mid-1980s, however, they have been finding it more difficult to maintain the pace of reform, against the reaction from bureaucratic and academic networks. The austerity measures and difficult political climate following the crackdown in June 1989 marked a further weakening of entrepreneurial reforms.

The resistance came from a new generation of bureaucrats trained in the Soviet Union or by Soviet experts in the 1950s. Premier Li Peng is archetypical of this generation. The formidable personal network created by these people provides the core political and administrative support for the military-industrial complex in China including, of course, the National Defense S&T and Industry Commission. The network has also maintained a strong position in the State Planning Commision and the State Economic Commssion. Finally, it is extremely influential in the industrial ministries and in the well-funded aeronautic and space technology establishment headed by prestigious scientists such as Qian Xuesen, a rocket expert who returned to China from the United States in the 1950s. The reluctance of this group of people to relinquish control, despite reformist rhetoric, has repeatedly provided a barrier to the implementation of S&T policy reforms.

The academic policy culture was, at least in the initial phases of reforms, not so much at odds with the entrepreneurial approach. Through the rehabilitation of intellectuals and the position granted to "scientific" advice in policymaking, the protagonists of the interests of universities and the research community were able to lobby for important new initiatives. The reform measures included the establishment of open laboratories for advanced research, science foundations, and expensive equipment for high-energy physics research. At the same time, however, reforms of the system of research and development funding presented new challenges for scientists. Antagonism to cuts in central state funding and other measures undermining basic research became particularly important in 1986–87, and for many institutions a new spate of key breakthrough S&T projects and a high-technology research plan provided a welcome chance to seek alliances with the bureaucracy.

This latest compromise between the bureaucratic and academic policy cultures was confirmed by Premier Li Peng in August 1989, when the theme of reform was being toned down considerably.[5] In his view, the reforms have "basically been successful"—i.e., terminated. Two remaining issues regarding bureaucratic and academic interests include the choice between serving the immediate needs of national economic construction or the long-term developmental needs on the one hand, and determining the relationship between basic and applied research on the other. The leadership adheres to a fundamental belief in dictating applied research priorities according to the needs of national economic construction so characteristic of the bureaucratic policy culture, but in order not to alienate the academic network there is a token support for basic research in official statements.

III. COMMERCIALIZATION AND ENTREPRENEURSHIP

It is instructive to look at two areas where the tensions between different S&T policy cultures have limited the success of the reforms. The successful growth of commercial transactions in know-how and the remarkable performance of new S&T firms during the 1980s led to an exposure of the contradictions existing between various groups and indicate the difficult environment for innovation in China.

A. COMMERCIALIZATION: THE TECHNOLOGY MARKETS

In the efforts to shift the attention of the Chinese research and development organizations toward market demand, the entrepreneurial reformers have emphasized commercial transactions to integrate research with production. The concept behind the new approach was borrowed from the theory of a socialist commodity economy that had gained so much popularity in the early 1980s. The key assumption was that the results of research and development—designs, prototypes, or simply know-how—constitute a commodity. Mechanisms for exchange of these "commodities" were then quickly established, initially in major industrial cities such as Shenyang but rapidly spreading to other cities. The primary vehicle for exchange of technology was the trade fair in which research institutes could exhibit the results of their work. In addition, during 1985–86, an increasing number of intermediary organizations emerged which served as brokers linking suppliers and customers.[6]

The growth of technology trade has continued to expand throughout the 1980s, as indicated by the estimates provided in Figure 5. Many transactions took place during the national or local technology trade fairs, but a new practice of direct contacts between research institutions and their customers was also gaining popularity. At the same time, however, instances of fraud and other questionable activities began to occur. The reaction was to increase control.

The entrepreneurial reformers at the SSTC reacted by strengthening indirect regulation: a more extensive legal frame-

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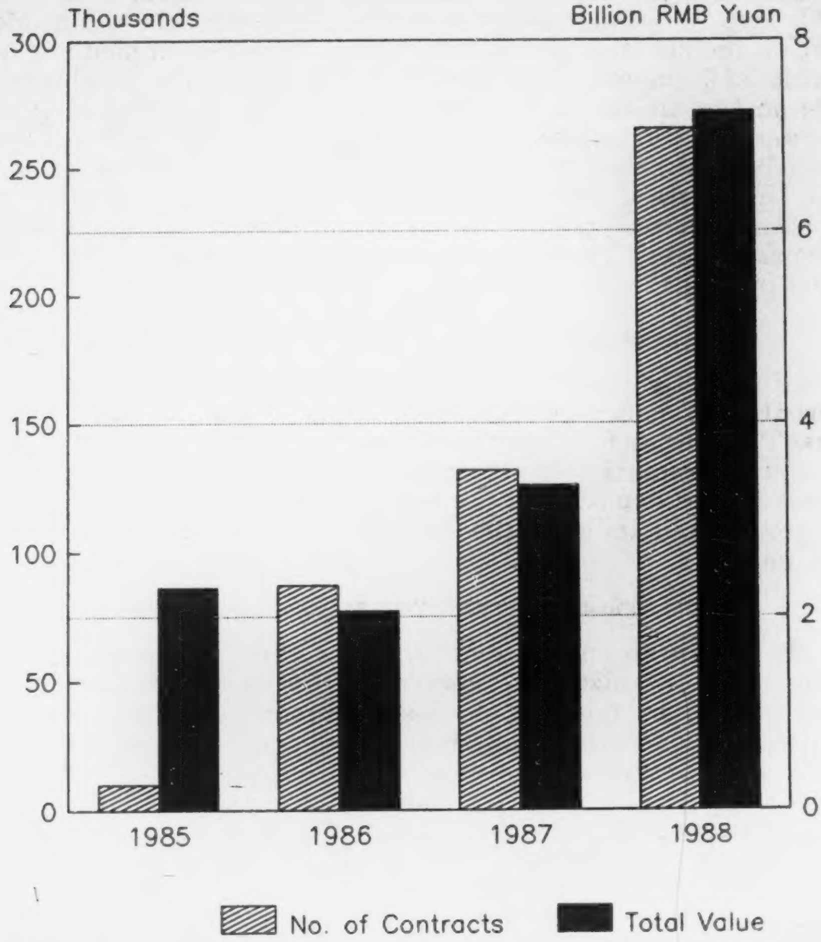
[5] "Woguo keji tizhi gaige jiben shi chenggong de (The Reform of China's S&T System Reforms Have Basically Been Completed)" *Keji Ribao (Science and Technology Daily)* 8 August 1989, p. 1.

[6] See E. Baark, "Commercialised Technology Transfer in China 1981–86: The Impact of Science and Technology Policy Reforms" *The China Quarterly* (September 1987), pp. 390–406.

FIGURE 5. THE VALUE OF TECHNOLOGY TRADE, 1985–87.



work for transactions in technology-related services was introduced with the Patent Law of 1985 and the Technology Contract Law promulgated in 1987. A Basic Science and Technology Law has also been discussed, but the process of formulating such a law appears to have slowed down significantly.[7] The bureaucratic reaction, in contrast, emphasized direct management of technology markets by specialized organizations. In October 1986 a China Technology Market Joint Development Group was established at the national level, and similar organizations were created at lower levels of regional administration. In theory, these organizations were intended to accelerate commercial transfer; in practice, they simply brought the market under the purview of the bureaucracy and created an intermediate level of management that levied new charges on the transactions.

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[7] The plans for legislation is discussed are S&T White Paper No. 2 issued in 1987. All the White Papers have contained useful collections of important laws and regulations in the sector.

The expansion of the number and value of transactions in the technology market, which subsequently took place in 1988, was thus, to a considerable degree, the result of "regularization" of the market and better statistics. Moreover, a substantial number of transactions derived from plan projects. These included the increasing number of research and development projects for which government organizations issued contracts after a tender. To assure broader diffusion, during the last few years there has also been a tendency of licensing technology which was originally developed under state plans, for use in the market. According to recent statistics, such projects constituted 30 percent of the total value of contracts in 1988.[8]

Many Chinese observers have, however, felt that the growth of the technology market was constrained by the economic system. In particular, the value of technology is generally considered very low, i.e., the remuneration for technical services, commissioned technological development, etc. undertaken by scientific institutions is rather meager. In 1987 the average value of technology license contracts was 29,200 RMB yuan, which was raised to 53,700 RMB yuan in 1988. Contracts for technology development averaged 66,500 RMB yuan, while technical services involved transactions that reached an average sum of only 17,500 RMB yuan.[9] These sums do not appear to indicate a lucrative market for the technology suppliers, particularly considering the rate of inflation and the devaluation of the Chinese currency.

Another constraint has been the low demand for new technology, particularly from the major state-operated enterprises. This characteristic is reflected in the prices, as indicated above, but is also found in the composition of buyers. The reformers had been particularly worried that the largest proportion of technology purchases during 1985–86 was made by small-scale and rural enterprises. The lack of demand from the large, state-owned sector confirmed a fear that the S&T institutions were still marginalized in relation to the core industrial sectors. They have been encouraged by statistics from 1987–88 indicating that an increasing proportion of buyers in the market belong to the category of large- and medium-scale enterprises.[10] The problem is, however, that most of the growth of this category may be derived from a larger demand from medium-scale enterprises. The possibility exists that the introduction of plan projects under the formal procedures of a technology market has led to a token increase in the demand for technologies from large state-owned enterprises. If this is the case, the technology market may be as marginal as ever in providing crucial inputs in the process of technological innovation in China.

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[8] Interviews, summer 1990.

[9] Figures provided in interviews during summer 1990. Prices are simply left to be determined by supply and demand, and a lot of theorizing concerning ways to fix prices has proven largely futile. See Erik Baark, "The Value of Technology: A Survey of the Chinese Theoretical Debate and Its Policy Implications" *Research Policy* No. 17 (1988), pp. 269–282.

[10] Interviews during summer 1990 indicated that this category occupied 58 percent of technology sales to industrial enterprises in 1987, and 68 percent in 1988.

B. ENTREPRENEURSHIP: SCIENCE AND TECHNOLOGY FIRMS

The commitment of reformers to entrepreneurship in the mid-1980s provided opportunities for the formation of new technology-based enterprises.[11] For research institutes and universities this meant the creation of a practical way of profiting from existing know-how. The main breeding ground for new S&T firms was the so-called "Electronics Street" in the Zhongguancun area of the northwestern suburbs of Beijing, which is also the site of many advanced research institutes in China.

The fate of Electronics Street and its entrepreneurial spirit is symptomatic of the tensions generated by entrepreneurial reforms in China. The history of the S&T firms in Electronics Street dates back to a "Service Department for the Development of Advanced Technology," which had been created in 1980 by a group at the Chinese Academy of Sciences, led by Chen Chunxian from the Institute of Physics.[12] Inspired by visits to Silicon Valley and Route 128 in the United States, this bureau was an attempt to combine R&D with production. Chen Chunxian's initiative was discussed by Hu Yaobang and other members of the CCP Central Committee in January 1983; their conclusion was approval of the "new road taken." In April 1983 an independent unit was formed under the name "Huaxia New Technology Development Institute."

The "overheating" of the Chinese economy in 1984–85 subsequently provided a fertile base for new technology firms. This was particularly the case in electronics, where a demand was generated by the somewhat naïve reactions to the "New Technological Revolution."[13] Electronics subsequently flourished, with annual growth rates of more than 100 percent, and pioneers such as Chen Chunxian's "Huaxia" firm became overshadowed by a core group of very prosperous companies. By 1987 eight companies led by a newcomer, Stone Computer Company, had captured a large part of the rapidly growing market for microcomputers in China. Figure 6 shows that the turnover of electronics firms rose from 18 million RMB yuan in 1984 to over 900 million RMB yuan in 1987.

The majority of new entrepreneurial units were collectively owned with participation by state-owned units or local authorities. There are virtually no genuinely "private" entrepreneurs, and even an unusually independent figure such as Wan Runnan from the Stone Computer Corporation had allegedly relied on intervention from higher authorities in the central government.

People associated with the academic policy culture have reacted to these new forms of interaction with society in an ambivalent fashion. On the one hand, many scientists respond with disdain. In their view, the entrepreneurs were not really engaged in technolog-

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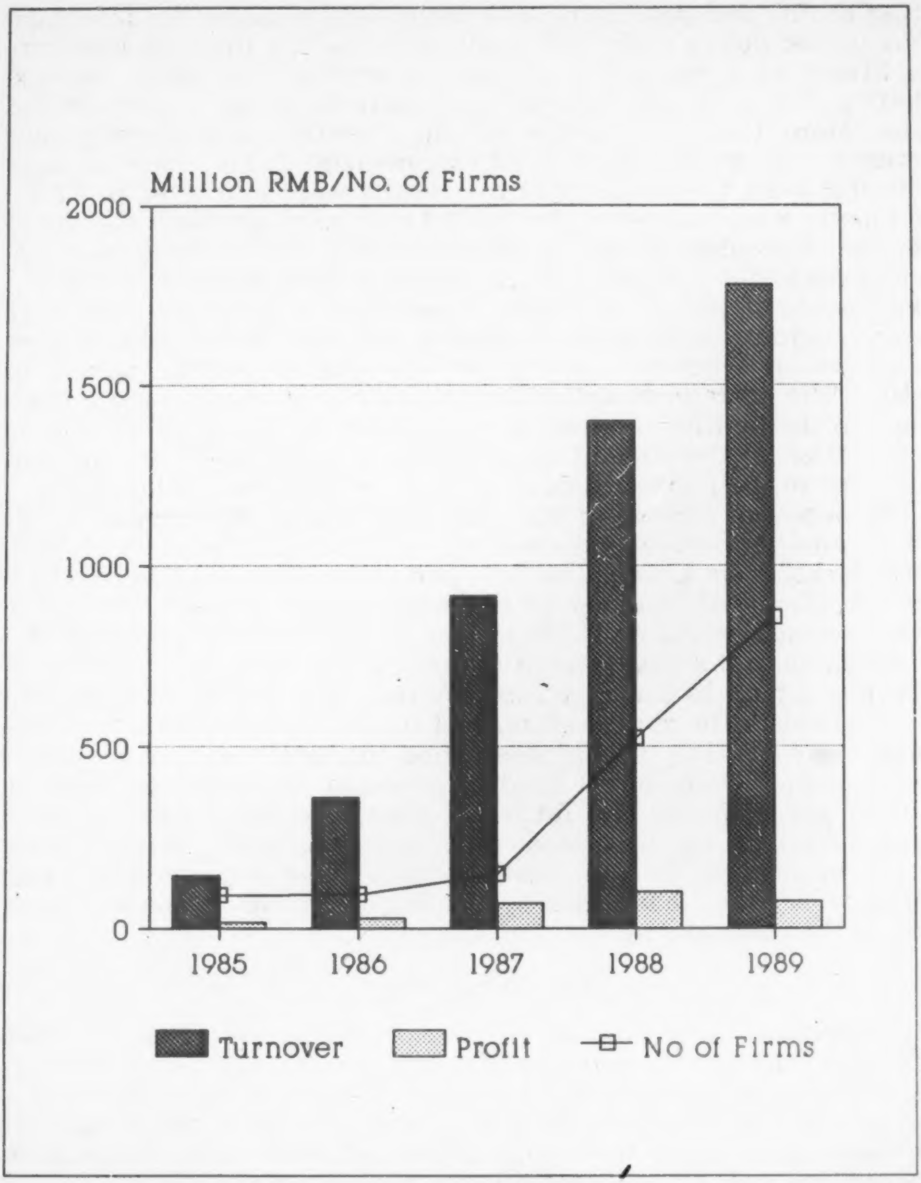
[11] The reforms initially encouraged "Research-Production Alliances" (*Keyan shengchan lianheti*), but as firms gradually became independent from their original units, the term "Science and Technology Firm" (*Keji qiye*) was coined. In the remainder of this paper the generic term "S&T firms" is used.

[12] For details see Yu Weilian (ed.), *Xiwang de huoguang (The Blaze of Hope)* (Beijing: Zhongguo renmin daxue chubanshe, 1988). Some results from this study have also been published in White Paper No. 3 on S&T (1988). Another valuable source of information has been Miao Qihao "Science Parks for Development: the Chinese Case," Paper presented to the Research Forum of the conference on R&D, Entrepreneur and Innovation, Manchester, U.K., July 1990.

[13] The demand was apparently also fueled by the introduction of new formal criteria: in order to be classified as "advanced," for example, the enterprises needed to install a computer!

FIGURE 6. ELECTRONICS STREET: NUMBER OF FIRMS AND TURNOVER.



ical development, but only in the marketing of imported computer hardware. On the other hand, the scientists are under considerable pressure to earn money through entrepreneurship themselves, and the need to solve this problem has made it necessary to accept a much broader definition of their work.

In 1987 it became clear that the spin-off entrepreneurial firms were more effective than most state-operated units—in both generating profits and developing new technology rapidly. An investigation carried out in early 1988 confirmed that the firms on Electronics Street were capable of conducting product innovation and exploiting domestic and international markets at an unprecedented rate. More than 75 percent of the research and development projects carried out by the entrepreneurial firms were finished within a year; the majority of the results were marketed in China and many were marketed abroad.[14] These were precisely the qualities that were desired by the reformers; but in addition to the academic contempt toward such commercial flair, which is a distinctive feature of both traditional Chinese Confucian values and more recent communist dogmatism, there was a fear of the political consequences of "private" enterprise. The *enfant terrible* buried in most of the entrepreneurs of Electronics Street represented a challenge to the political system. Wan Runnan thus engaged the Stone Corporation in the student demonstrations in spring 1989, and had to escape to the United States and France after the crackdown.

The apparent success of the entrepreneurs on Electronics Street led to another interesting development: the proliferation of "Science Parks" [15] in China. The first park was established by the Chinese Academy of Sciences in Shenzhen. After a feasibility study commissioned by the SSTC, the State Council in 1988 approved the establishment of a new zone in Beijing, comprising many of the enterprises set up in the Electronics Street. The preliminary experience gained in the zones established in Beijing and Shanghai indicates, however, that the Chinese science parks are seldom a spontaneous phenomenon, but a kind of program sponsored by local or central government. The future of these programs depends to a large extent on the macroeconomic situation, and although many of the enterprises in the existing zones have continued to grow during 1989, they have also been affected by the austerity measures of the government.

IV. Conclusions

The paradox of fragmented innovation in China derives from two interacting forces: the schisms of policy compromises and the inertia of the economic system. Arguably, China's many enterprising and talented scientists, technicians, and managers are caught in "scissors" that limit their innovative capability and marginalize their efforts contribute effectively to economic growth.

My own view is that the political reaction to reform in the last half of the 1980s, which culminated in the dramatic confrontations of May–June 1989, will continue to constrain the innovative policy instruments introduced by entrepreneurial reformers. Compromises between major institutional networks will continue to characterize the reform process, rendering it partly ineffective. The problem is also the existing structure of the economy, with its biased price system, the lack of venture capital outside official channels, and the pervasive interpersonal relations in economic transactions. This structure constitutes a gravitational force that, in a sense, "pulls" the activities of innovative units and persons down toward earlier modes of conduct. The conservatism and inertia of S&T management in China can thus be expected to continue to influence innovation in the 1990s.

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[14] See table 2 on page 48 in White Paper on S&T No. 3 (1988).

[15] Officially known as "*Xin jishu chanye kaifa shiyanqu* (New Technology Industrial Development Experimental Zone)." Enterprises in such zones are provided with a package of incentives such as lower tax rate, longer tax holiday, promotional activities, etc.

CHINA'S HIGH TECHNOLOGY: PROGRAMS, PROBLEMS, AND PROSPECTS

By Richard P. Suttmeier *

CONTENTS

	Page
Summary	546
I. China's Technical Resources	548
II. The "Main Battlefield"—The Regular Plans	549
A. The "863" Program	550
B. The "Torch Plan"	553
III. New Enterprises and New Enterprise Zones	557
IV. The Defense Sector	559
V. Discussion and Assessment	559

TABLES

1. Leading Provinces in S&T Resources	549
2. Concentration of S&T Resources, by Region	549
3. Torch Projects, by Region and Technology, 1988 and 1989	555

FIGURES

1. "863" Projects, by Performer	552
2. "863" Projects, by Field	553
3. Torch Projects, by Field, 1988–1989	555
4. Torch Projects, by Region	556

SUMMARY

Since the suppression of the demonstrations in Tiananmen Square on June 3 and 4, 1989, international interest in China's economic technological and scientific development has declined. Programs of exchange and cooperation with China were suspended by many countries. With the dramatic changes in Eastern Europe and the Soviet Union, the spotlight which China enjoyed for the better part of a decade shifted elsewhere. While these changes in the international environment have clearly had important consequences for Chinese development programs, we should not lose sight of the fact that these programs go on.

Before June 4th, China's high-technology aspirations had just been redefined and were beginning to attract international attention. China, after all, with its large technical community, represented an intriguing possibility for a Western Pacific region which increasingly saw its economic future in terms of high-technology development. Where China was going with its high-technology pro-

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grams, and the chances for their success, had implications not only for China's future, but also for the future of the region. These kinds of issues are no less important today, after June 4th, than they were before.

Unlike the Asian newly industrializing economies (NIEs)—South Korea, Taiwan, Hong Kong, and Singapore—whose interest in high-technology industry stems from the successful exhaustion of their labor-intensive industrialization strategies, China has only begun to exploit its comparative advantage in low-cost labor. The NIEs, on the other hand, in the face of rising labor costs, have concluded that their continued prosperity will require industrial restructuring to achieve higher value-added manufacturing through high technology.

The Chinese rationale for its high-technology initiatives is somewhat different.[1] First, many Chinese leaders are ambivalent about overreliance on labor-intensive industrialization. According to Li Xu'e, the Vice Minister of the State Science and Technology Commission (SSTC) responsible for the "Torch" Plan (discussed below),

> ". . . although in labor-intensive industries China has the advantage of cheap labor, we lack clear advantages in such other factors critical to product competitiveness as product quality, modern management, and after sales service . . . the added value produced by these industries is small, and the competition among undeveloped countries is fierce." [2]

These leaders reason that, although China remains an underdeveloped country by many measures, in one respect—its larger number of scientists and engineers—it is more like a developed country. Furthermore, China has had considerable experience with high-technology research and production as a result of its strategic weapons programs, and already has a high-technology industry which produced goods and services worth 70 billion yuan in 1987. Finally, the leaders of China's technical establishment fear that unless China at least "pays its dues" to high-technology development, it will fall further behind other nations in a world where, in their view, a nation's wealth and power will increasingly be based on science and technology.

The main components of China's evolving strategy for high technology include (1) the support of research, development, and applications through the mechanisms of annual and five-year plans; (2) the initiation, in 1987, of a high-priority national high-technology program, the so-called "863" Program; (3) the initiation of the "Torch" Plan in 1988 to encourage the industrial application of research results; (4) the encouragement of high-technology entrepreneurship, the start-up of new firms, and the support of special high-technology industrial zones; and (5) the conversion of military research and production facilities to civilian use. Before discussing each of these in greater detail, I will explore further some of the conditions affecting high-technology development.

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[1] See Li Xu'e. "Some Problems in the Development of China's High Technology Industry." *Zhongguo Keji Luntan*, (*Forum on Science and Technology in China*). No. 6, November 18, 1990. In JPRS–CST–90–008. March 15, 1990. This discussion also draws on the author's interview with Zhang Binfu of the "Torch" Plan office, August 1989.

[2] Li Xu'e. "Some Problems."

I. CHINA'S TECHNICAL RESOURCES

There is little doubt that China's investments in the development of science and technology over the last 40 years have had extremely disappointing economic consequences. Yet, there is also little doubt that those investments have produced a very large technical establishment, second to none in size in the developing world. The number of scientists and engineers in major centers, like Shanghai or Beijing, alone, exceed the number for most countries—including such development exemplars as South Korea and Taiwan. That this establishment has been inefficiently run, and has failed to maintain reasonably uniform quality standards, cannot be denied. But it still represents a large pool of human and material resources waiting to be exploited. Let us consider its dimensions.

By the end of 1988, China had 5,275 state-run research institutes, including some 120 in the Chinese Academy of Sciences (CAS). These employed approximately 384,000 scientists and engineers (50,000 in CAS), of whom 345,000 (30,000 in CAS) were in research and development. In addition to another 2,498 institutes at the country level, which employed 64,000 personnel, 12% of whom were scientists, the 1980s also saw the growth of some 4,870 collective and privately owned research establishments. These employed 61,000 scientists and engineers in 1988.

Finally, China's 1,063 institutions of higher education employed 541,000 science and technology personnel in 1988, with 161,000 full time equivalent scientists and engineers engaged in R&D. While it is still difficult to arrive at internationally comparable indices of levels of effort, the data above suggest that as many as 450,000 scientists and engineers are engaged in R&D.[3] Total expenditures for R&D in 1988 were probably on the order of RMB 15 billion.[4]

One of the more interesting features about Chinese technical capabilities is their spatial distribution. While we often correctly assume that Beijing and Shanghai are major centers of Chinese science and technology (S&T), they are not alone. Past policies and historical accidents have in fact distributed China's technical resources well beyond those two cities, as Table 1 illustrates.

Table 1 indicates that each major region of China is represented by at least one province as a technical nucleus. It is clear from Table 2, however, that when the regions are taken as a whole, not surprisingly, there are considerable differences in resources among them. Nevertheless, these data do show that there is a much wider distribution of capabilities in the country than visits to the more internationally visible centers along the coast would lead one to suspect.

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[3] Based on Richard P. Suttmeier. "Science and Technology Resources in China," unpublished report to the National Science Foundation, and on the author's discussions with Zhao Yuhai and Dong Liya of the State Science and Technology Commission (SSTC), August 1989.

[4] This figure is based on published figures of state expenditures and amounts spent by industry which are estimated to be 50% of the former.

TABLE 1. Leading Provinces in S&T Resources

Number of Institutes		Number of S&Es		Expenditures	
Beijing	393	Beijing	79,540	Beijing	2,627,553
Liaoning	332	Shanghai	30,624	Shanghai	1,088,324
Jiangsu	301	Sichuan	23,122	Sichuan	882,675
Sichuan	277	Shaanxi	18,324	Liaoning	634,002
Shandong	267	Jiangsu	17,742	Shaanxi	619,488
Guangdong	258	Liaoning	17,548	Jiangsu	560,126
Hubei	248	Hubei	11,648	Guangdong	380,530
Shanghai	242	Tianjin	10,810	Tianjin	369,959
Heilongjiang	231	Guangdong	10,101	Henan	360,822
Hunan	201	Henan	9,613	Hubei	324,188

Source: Richard P. Suttmeier. "Science and Technology Resources in China," unpublished report to the National Science Foundation, and on the author's discussions with Zhao Yubai and Dong Liya of SSTC, August 1989.

TABLE 2. Concentration of S&T Resources by Region

Number of Institutes		Number of S&Es		Expenditures (Yuan)	
East	1,392	East	108,739	East	3,525,106
South Central	1,038	North	76,120	Northeast	2,499,097
Northern	1,023	Northeast	43,125	South Central	1,499,834
Northeast	712	South	34,449	Southwest	1,164,546
Southwest	557	Southwest	31,779	North	1,096,870
Northwest	549	Northwest	30,548	Northwest	1,034,120

Source: Richard P. Suttmeier. "Science and Technology Resources in China," unpublished report to the National Science Foundation, and on the author's discussions with Zhao Yubai and Dong Liya of the SSTC, August 1989.

As is shown below, the growth of high-technology initiatives is also not limited to a few centers. The data in Tables 1 and 2 illustrate why this is so.

II. THE "MAIN BATTLEFIELD"—THE REGULAR PLANS

Chinese commitment to high technology through the planning process goes back to the 1950s with the adoption of a 12-year plan (1956–67) for S&T developments. This plan led to the introduction into China of capabilities in such fields as computers, semi-conductors, automation, radio electronics, nuclear and jet propulsion technologies.[5] During the course of this plan period (the actual plan objectives had been met by the early 1960s, and a new plan was introduced in 1962), Chinese science became both more militarized (and thus increasingly, in high-technology areas, cut off from the civilian economy), and more subject to radical politics. The planning process was seriously disrupted by the Cultural Revolution, but highly focused high-technology work continued in support of military missions. The goal of the mid-1950s to develop a broad base of generic, science-based technologies—fell victim (to the great detriment of the economy and of scientific research) to the development of more specialized (and highly classified) competence in the military sphere.

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[5] State Science and Technology Commission. *Guide to China's Science and Technology Policy, 1986. (White Paper on Science and Technology, No. 1, hereafter, "White Paper")* Beijing, 1987, p. 16.

The first major effort at broad-based science planning in the post-Mao period, the National Science and Technology Development Plan for the 1978–85 period, was strongly oriented toward high technology. It identified 108 key projects in 8 priority areas: agriculture, energy, materials, microelectronics, lasers, space, high-energy physics, and genetic engineering. Within a year of its announcement, however, this plan was being reconsidered. By the early 1980s its emphasis on basic research and high technology had been toned down considerably. These priorities were too far removed form China's immediate economic needs, it was thought, and shortages of both money and high-quality manpower argued against a major push into high technology at the time. Policy and planning attention for S&T, therefore, turned to the more pragmatic concerns of the sixth Five-Year Plan (FYP) (1980–85) for the economy.

High-technology development was not entirely excluded, however. Though not on the list of priorities for the sixth FYP, work on large-scale integrated circuits, computers, computer software, communications (including optical fibers, microwaves, satellites, digital exchanges, and networks), biotechnology, new materials, space technology and remote sensing, lasers, and isotopes and radiation technology was mentioned.[6] Many of these areas of research received a boost when they were included in the "Scientific and Technological Key Projects Program" of the seventh FYP when it was adopted in 1986.[7]

Since the five-year plan continues to be an important mechanism for relocating the nation's resources ("the main battlefield"), one of the more important modes of support for high technology is through the conventional planning process. In the sixth FYP, some RMB 1.5 billion was set aside for science projects organized around 38 major "programs," but most of them were not in high technology. The commitment to science in the seventh FYP was substantially greater, RMB 5 billion in support of 76 programs.[8]

Support of research relevant to high technology through the regular planning process continues to be evident in the recently announced basic research priorities for the eighth FYP. These include high-temperature super-conductivity, the structure and properties of optoelectronic materials, semi-conductor super-lattice physics, as well as projects pertaining to biotechnology, geophysics, and the environment.[9]

A. THE "863" PROGRAM

By the mid-1980s, with more funds becoming available for S&T, the expansion of the technical manpower pool,[10] (including the

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[6] *White Paper, 1986*, 189–215.

[7] *White Paper*. p. 153.

[8] *Keji Ribao*, (Science and Technology Daily), 8 April, 1989. In JRPS–CST–89–015, August 18, 1989, p. 1

[9] *Keji Ribao (Science and Technology Daily)*, December 23, 1989, On JPRS–CST–90–007, March 6, 1990, p. 3.

[10] The number of individuals working in S&T in state organizations increased by 38.6% between 1982 and 1987. In this same period, there were 1,863 million college and university gradu-

Continued

return of technical personnel from advanced study of abroad), and a deepened appreciation of the world high-technology revolution, a consensus was developing that China could not afford not to get into high technology more ambitiously. In March of 1986, laser specialist Wang Dahang and three other senior scientists wrote to Deng Xiaoping urging the initiation of a new national high-technology program. The Party Central Committee approved the idea in October, and the program began in early 1987 as the National High Technology Development Program (referred to in China as *baliusan* literally, 86/3, or March 1986). The Program reportedly, ". . . aims to pool together the best technological resources in China over the next 15 years to keep up with international high technology development, bridge the gap between China and other countries in several most important areas, and wherever possible, strive for breakthroughs. The programme also aims to provide technological backup for economic development and train large numbers of talent for the future." [11]

The national high technology program has the following priorities: [12]

1. *Biotechnology* (High-yield, high-quality, adversity-resistant plants and animals; New medicines, vaccines and genic therapy; protein engineering)
2. *Space Technology*
3. *Information Technology* (Intelligent computer systems; Optoelectronic devices and microelectronic optoelectronic systems integration technology; information acquisition and processing technology)
4. *Laser Technology*
5. *Automation Technology* (Computer-integrated manufacturing systems; intelligent robots)
6. *Energy* (Coal-fired magnetohydrodynamic power generation; advanced nuclear reactors)
7. *Advanced Materials*

The overall management of the Program is divided between the Basic Research and High Technology Department of the State Science and Technology Commission and the National Defense Science, Technology and Industry Commission, but its actual administration employs an innovative (for China) peer-review system. Each of the seven areas above has a senior expert advisory committee (the average age of the members is 72). Below these are 15 "expert task groups" (involving a total of 106 scientists and engineers with an average age of 48) who designate projects warranting support, and who review the progress of grants on an annual basis. In project selection, the Program uses a "bottom up" approach, with project ideas originating from potential investigators (inspired by U.S. practice), and the "top down," more targeted approach favored by the Japanese.[13]

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ates, and some 69,000 recipients of graduate education in China (in all fields). (11 April, 1988). In JPRS-CAR-88-023, p. 17.

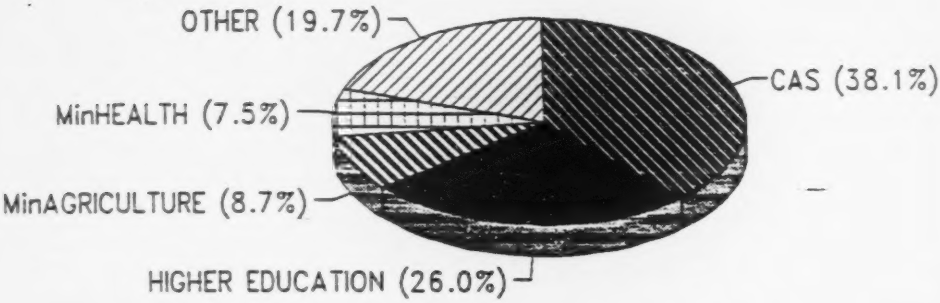
[11] "An Outline of the Hi-Tech Development Programme in China." Beijing. The Science and Technology Leading Group of the State Council, 1987.

[12] *Ibid.*

[13] Based on author's interview with Ma Junru, Head of the Fundamental Research and New Technology Department of SSTC, August 1989.

Approximately RMB 500 million has been spent on the Program since it began.[14] The number of projects supported, some 1,000 thus far, is expected to ebb and flow from year to year, depending on quality and size of project (one of the larger projects, in semiconductor lasers, has consumed RMB 30 million, but others have been less costly). The Program has involved some 10,000 scientists and engineers in 500 organizations from the three main sectors of the R&D establishment—CAS, institutions of higher education, and ministerial research institutes. In 1988, the distribution of funding by sectoral performer was as follows:[15]

FIGURE 1. "863" PROJECTS, BY PERFORMER.



A small fraction (2%, or RMB 7.5 million in 1988) of the Program's budget has been transferred to the National Science Foundation of China to be administered by that agency in support of exploratory research.[16] About 2,000 technical personnel have been involved in some 200 exploratory basic research projects.

Figure 2 summarizes the distribution of funding in 1988 by major subject area.[17]

Successes to date have been reported in projects dealing with optoelectronics, lasers, rice germination, hepatitis-b vaccine, and new materials. In the belief that it would be more cost-effective to concentrate resources, new national centers have been established in three areas of technology—optoelectronics, computer-integrated manufacturing systems, and robotics. More generally, with big projects that require cooperation from different institutes, there is often fierce competition for the right to host the project, and thus reap the long-term benefits of keeping the new equipment involved. While an administrative problem, this competition is also a measure of the keen interest taken in the Program by the research community.

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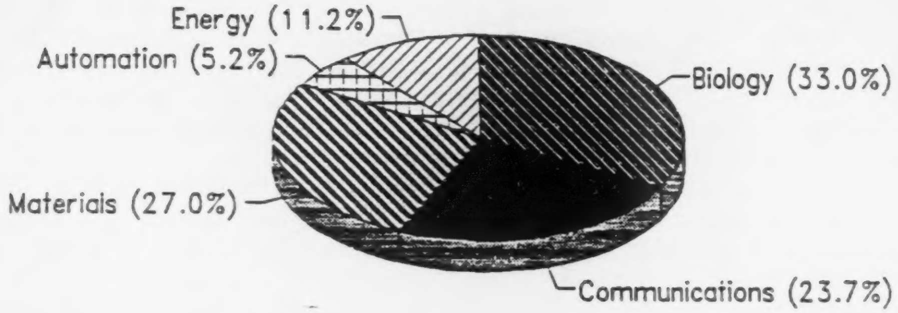
[14] Approximately RMB 200 million was expended in 1988, with some RMB 300 million to be spent in 1989 (Ma Junru interview). These figures would suggest that the 863 Program is budgeted at about twice that of the National Science Foundation of China.

[15] Shang Mu. "Progress in China's High-Technology Research and Development Plan." *Keji Ribao* (*Science and Technology Daily*). November 17, 1990. In JPRS-CST-90-005, February 8, 1990, p.4.

[16] China's total expenditure on basic research in 1987 has been estimated to be RMB 800 million, or 7% of the total R&D expenditures. *Jiefang Ribao*, February 14, 1989, p. 3.

[17] Shang Mu. "Progress in . . . ."

FIGURE 2. "863" PROJECTS, BY FIELD.



The primary purpose of the Program—is to prepare China for the high-technology challenges of the turn of the century—through research and international technology monitoring. Nevertheless, some of the results of the 863 program are finding their way into applications, and research results during the 1990s are expected to have commercial potential. Questions of property rights are among the more important issues surrounding commercialization. One response has been the promotion, under the SSTC, of a new technology brokerage firm called "Xe Zhao." Should patentable discoveries result from 863 projects, Ke Zhao would acquire licenses to these patents which it would then relicense to enterprises.[18] As discussed further below, ownership questions have been further clouded by political developments since June 4, 1989.

B. THE TORCH PLAN

Concerns for the commercialization of research, including but not limited to the 863 Program, prompted the initiation of the "Torch" Plan in August 1988. Torch, which is administered by the Torch High Technology Industry Development Center (established in 1989) under the Industrial Science and Technology Department of the SSTC, is in many ways a product of the reform decade. Its approach to problems of moving research to production shows the influence of 10 years of exposure to foreign innovation systems, and its foci of attention are the new organizational forms (e.g., start-up firms), and institutional possibilities (e.g., high-technology development zones) which emerged in the 1980s.

The Plan's main objectives include the following:[19]

1. *Policy Guidance*. Provide policy guidelines conducive to the growth of high-technology industry and the transfer of knowledge from laboratory to enterprise. The main focus of this work is to coordinate policy for, and oversee, existing (or planned) special eco-

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[18] Ma Junru interview.

[19] Based on interview with Zhnag Binfu of the Torch program Office, SSTC, August 1989. See also three important articles translated from *Zhongguo Keji Luntan* (*Forum on Science and Technology*) No. 16 November 18, 1989, pp. 2–14, in JPRS–CST–90–008, March 15, 1990, pp. 1–13.

nomic zones for high technology and new technology, some 30 of which now exist (see below).

2. *Establishment of Technology Enterprise Service Centers*. Some 30 of these are to be established during the first few years of the Program (25 had been set up by April, 1990). Borrowing from the Western concept of "technology incubators," the centers are to provide comprehensive services and information pertaining to finance, equipment procurement, marketing, taxes, foreign travel, etc. to those (especially scientists and engineers) seeking to establish new companies. The Donghu New Science and Technology Startup Services Center in Wuhan served as the prototype.

3. *Training*. During its first few years, the Program aims to provide management training for up to 20,000 individuals in various aspects of operating high-technology firms for both the domestic and international markets.

4. *Finance*. The Torch Program has a limited budget, and thus approaches the financing of high-technology start-ups more as a broker than a banker. The Program uses its influence to facilitate loans and investments from banks and local governments with promises of payback periods of 3–4 years. The Industrial and Commercial Bank of China has been especially active in supporting the Program, providing RMB 200 million and 10 million in U.S. dollars in 1988 and 1989.[20]

5. *Organize Specific Projects Valued by the State*. Some 272 such projects (out of 1500 project proposals received) have been supported during 1988 and 1989 in five major areas designated as priorities—new materials, microelectronics and information, energy (high-efficiency and conservation technologies), biotechnology and electromechanical devices ("megatronics"). Approximately RMB 1.5 billion has been invested in support of these projects. This investment is expected to produce returns of RMB 5.6 billion annually and earn some 580 million U.S. dollars in annual exports.[21]

Torch originally was not intended to focus on large state enterprises which have their own research to production strategies. After two years experience, and the realization that economic benefits may in some cases be a function of scale economies, this may now be changing.[22]

Table 3 shows the distribution of Torch projects for 1988 and 1989 according to province and priority technology.

The large number of projects in the electronics and information and new materials categories is consistent with Chinese interests and strengths in these technologies. It is somewhat surprising that there are not more projects in biotechnology, and that there are as many as there are in megatronics. (See Figure 3).

The geographical distribution of projects is suggestive. The Plan has reached all of China's provinces except four (Xinjiang, Qinghai, Yunnan, and Tibet), but as Figure 4 indicates, the greatest concentration of activities is in three regions: North China, East China,

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[20] *Xinhua*, April 19, 1990, FBIS–CHI–90–077, April 20, 1990, p. 34.

[21] *Ibid.*

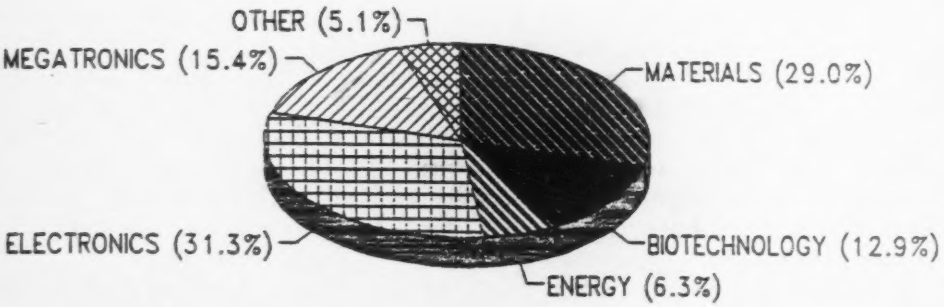
[22] *Renmin Ribao*, (*People's Daily*), February 3, 1990, FBIS–CHI–90–039, February 27, 1990, p. 21.

TABLE 3. Torch Projects by Region and Technology, 1988 and 1989

City	Materials	Biotech.	Electronics and Information	Megatron.	Energy	Other	Totals
Beijing	16	8	24	8	4	2	59
Guangdong	5	8	10	0	4	1	28
Hubei	9	3	3	3	1	2	21
Liaoning	10	0	0	6	1	1	18
Jiangsu	4	1	5	5	0	1	16
Zhejiang	3	1	2	6	1	2	15
Shandong	4	6	2	0	2	1	15
Henan	4	1	3	1	2	0	11
Shanghai	4	1	3	3	0	0	11
Anhui	1	2	7	1	0	0	11
Guangxi	2	0	3	2	0	0	7
Fujian	1	0	5	1	0	0	7
Hebei	1	0	5	0	0	0	6
Hunan	3	0	0	1	0	2	6
Sichuan	2	0	2	2	0	0	6
Tianjin	2	2	2	0	0	0	6
Heilongjiang	1	0	2	0	1	1	5
Shaanxi	1	0	4	0	0	0	5
Hainan	0	1	3	0	0	0	4
Gansu	1	1	1	0	1	0	4
Jilin	1	0	2	0	0	1	4
Nei Mongu	1	0	0	1	0	0	2
Jiangxi	2	0	0	0	0	0	2
Ningxia	1	0	0	0	0	0	1
Shanxi	0	0	0	1	0	0	1
Guizhou	0	0	0	1	0	0	1
TOTALS	79	35	85	42	17	14	272

Source: *Keji Ribao.* (*Science and Technology Daily*). August 6, 1990. In JPRS–CST–89–024. November 1,1989. pp. 1–9. This report also provides the topics for each of the 271 projects.

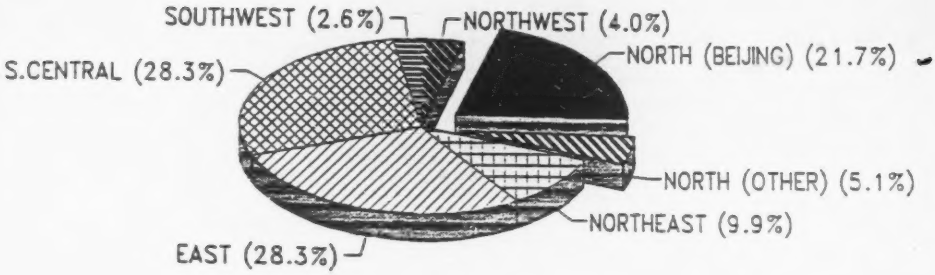
FIGURE 3. TORCH PROJECTS, BY FIELD, 1988–1989.



and the South Central region (which includes Guangdon and Hubei).

Eighty percent of projects in the north are in Beijing, presumably a reflection of the large concentrations of S&T talent in the capital, *and* the fact that Beijing has been a leader in high-technology entrepreneurship (discussed further below).

FIGURE 4. TORCH PROJECTS, BY REGION.



On the other hand, the extensive activities in East China are not a reflection of a concentration in Shanghai; projects are distributed rather evenly among most of the provinces (Shandong, Jiangsu, Zhejiang, Henan, Anhui) which make up the region. The low number of projects in Shanghai, especially in comparison with Beijing, is interesting. It is less a measure of Shanghai's importance as a center of high technology, than of the fact that the Torch plan is not attempting to compete with high-technology activities which are part of other national programs, of which Shanghai is a major participant. On the other hand, East China (minus Shanghai) has been a center of collective and township enterprise during the past decade, and also has a large number of collective and private research organizations.

The same can be said of the South Central region, especially its two main centers, Guangzhou and Wuhan. Guangdong province has perhaps been the greatest beneficiary of the decade of reform; both institutionally and attitudinally, this province is likely to feel quite comfortable with a program such as Torch. Wuhan, like Beijing, is both a major center of technical resources *and* has been active in high-technology entrepreneurship. It should be noted, however, that Torch projects in Guangdong and Hubei provinces are not exclusively located in these two major cities.[23] The spatial distribution of Torch projects seemingly reflects the influence of the coastal development strategy and, as we shall see below, it is closely related with the establishment of high-technology enterprise zones (the distribution of which also seems biased toward the coastal regions).

When it began, the Torch Plan assumed an active level of international cooperation as part of its activities. The plan is open to foreign investment, and contracts have been made with foreign venture capital firms. As noted above, the Chinese market for high-technology is still relatively small; the international market is thus very important for the program. China, of course, also hoped to enter into joint ventures which would combine Chinese expertise and the "critical elements"—finance, special materials, management, and marketing expertise—from abroad which are not available in abundance in China. While progress toward the internationalization of Torch has been slowed by the events of June, 1989, the perceived importance of international cooperation, apparently, has increased.

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[23] This is true for the plan in other provinces as well, where projects are located in a number of smaller cities. Of Shandong's 15 projects, for instance, 6 are in the provincial capital of Jinan, 3 are in Quingdao, 3 are in Zibo, and 1 each in Qufu, Weihai and Rongcheng.

At a national Torch conference held in May 1990, the questions of internationalization received prominent attention. Emphasis was placed on the establishment of "bridge" and "showcase" firms in the United States, Japan, Germany, Hong Kong, and Macao, and on more foreign participation in the training of management personnel for high-technology enterprises.[24] In June 1990, Torch officials signed an agreement with a U.S. firm, Omega Orient Industrial Company, to establish a company in Houston to serve as a "window" on the international market for the Program.[25]

While the Chinese press during the past year has been filled with enthusiastic reports about progress of the Torch Plan and its prospects for the future, it is difficult at this stage to render any serious evaluation of it. Torch is best assessed in the context of the high-technology strategy more generally, a subject discussed further below.

III. New Enterprises and New Enterprise Zones

Since its initiation in August 1988, the Torch Plan has been given a special responsibility to foster new high-technology firms and to oversee and promote the development of special high-technology enterprise zones. But activities in these two areas predate Torch and illustrate another side to China's high-technology development story.

As early as 1984, in its talent-rich Haidian district, Beijing began to see the appearance of new firms growing out of the many research institutes located there. Most were being spun off from CAS and still had formal ties with the Academy. Some, however, were started by individuals who broke with "the system" and began pushing the limits of what the reform environment would allow. These became known as the *min ban* (nonstate) enterprises, most of which employed some form of collective ownership, with many also had some sort of relationship with the Haidian district government.[26] The Stone Corporation, which became deeply involved with the political demonstrations of early 1989, was one (but not the only one) such firm.

Under the reform conditions of the 1980s, the numbers of both kinds of enterprises continued to grow. Reform policies of two sorts were at work. One, as noted, encouraged the growth of collective enterprises and technical entrepreneurship, and more generally made the possibilities for technical careers outside of the state sector real for the first time since the 1950s. The other policy thrust pertained to the research establishment and attempted to force research institutes to better serve the economy by cutting their guaranteed annual appropriations. Along with other reforms internal to CAS, shrinking budgets pushed research institutes to seek new ways of generating revenues. Starting their own firms became one of the means chosen.

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[24] *Xinhua*, June 6, 1990, In FBIS-CHI-90-112, June 11, 1990, p. 7.

[25] *Xinhua*, June 6, 1990, in FBIS-CHI-90-112, June 11, 1990, p. 7.

[26] Cf. Marc Abramson. "Minban Science Firms in China." *China Exchange News*. Vol. 17, No. 4. December 1989, pp. 12–17. See also Richard P. Suttmeier. "Listening to China." *Issues in Science and Technology*. Fall 1988; and Richard P. Suttmeier. "Laying the Corporate Foundations for China's High Tech Future." *The China Business Review*, July–August 1988.

The number of firms in the Zhongguancun area of Haidian district grew rapidly after 1987, and its main thoroughfare, Haidian Road, became known as "electronics street." While many of these firms can be legitimately described as high-technology companies (selling products, technology, or both which they themselves developed), many others have been (and still are) better described as technology traders (often offering hard-to-obtain foreign hardware) and technical service firms.[27]

In May 1988, after a thorough investigation by the Party Central Committee, the State Council approved the designation of the area as the Beijing New Technology Development Zone, entitling its firms to preferential tax treatment and foreign exchange regulations.[28] While Beijing is legitimately seen as the leader in the new entrepreneurship, start–up companies and special zones were also appearing elsewhere after the mid-1980s, including the special "science park" sponsored by the CAS in Shenzhen (begun in 1985), Shanghai's Caohejing (which, with its 15 foreign-invested enterprises now leads other zones in attracting foreign investment), and Guangzhou's Wushan. According to one report, the number of high-technology enterprises had reached some 15,000 nationwide by the end of 1989, with a work force of 80,000 people.[29]

The Beijing experience seemingly has been quite successful. Some 790 companies (including 139 established by CAS) had been approved as of June 1989, employing 26,000 people. In 1988, the firms in the zones had total earnings of RMB 1.4 billion (470 million yuan of which were from sales of technology), and had also earned $US 13 million through exports.[30] By May 1990, the total number of firms had risen to 894, the 50 largest of which had business networks around the country and annual incomes exceeding 5 million yuan.[31] The Stone Company alone generated about one-sixth of the total revenue of Haidian district.[32]

Since the formal State Council approval of the Beijing zone, there has been a rush to start high-technology zones elsewhere (or to provide formal designation, and thus policy preferences, to already existing zones). Most of these new designations have come as a result of local, rather than of central government action (though they are subject to central guidelines), and as a result, there is no one model for the zones. Special high-technology zones, of one sort or another, are now found in the following 30 cities.[33]

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[27] During the past year, revenues from trading dropped from 60% of the total for firms in the area to 32%, while technical service revenues increased from 20% to 40%. *Xinhua*, April 14, 1990. In FBIS–CHI–90–074. April 17, 1990, p. 49.

[28] This includes a three-year tax holiday, followed by another three years of reduced tax rates.

[29] Radio Beijing interview with Zhang Binfu of SSTC. February 7, 1990. In FBIS–CHI–90–043. March 5, 1990, p. 29.

[30] Zhang Binfu and Tang Juan. "An Excellent Start in Implementing the Torch Plan." *Zhongguo Keji Luntan Forum on Science and Technology*. No. 6. November 18, 1989. In JPRS–CST–90–008. March 15, 1990, p. 11.

[31] *Xinhua*. May 17, 1990. In FBIS–CHI–90–097. May 18, 1990, p. 23.

[32] *Beijing Review*. No. 1. January 1–7, 1990. In FBIS–CHI–90–004-S. January 5, 1990, p. 39.

IV. THE DEFENSE SECTOR

A large concentration of technical resources exists in China's defense R&D and defense industries. S&T personnel in defense industries constitute 13% of the work force, in comparison with an average of 3% in civilian industry.[34] China's programs in nuclear weapons and space have spurred development in a whole range of attendant technologies—materials, electronics, new processing techniques, etc.—of potential commercial value.[35] Institutions such as the National Defense Science and Technology University in Changsha, which developed the Galaxy supercomputer, are also active in such fields such as artificial intelligence, precision guidance, stealth and counterstealth technologies, simulator technologies, and flexible manufacturing.[36]

Since the early 1980s the defense sector has been given the charge to assist the civilian economy by technology transfers and through the conversion of its plants to civilian production. According to one report, some 3,000 long-standing civilian production problems during the 1980s were solved with technologies from the defense sector, netting the latter more than 2 billion yuan for the know-how supplied; by 1989 the value of production for the civilian economy from defense plants had risen to 66% of total output value, up from 10% in 1979.[37]

While the exploitation of the technical talents of the defense establishment is not without problems,[38] the Chinese believe it holds great potential. The latest moves to accelerate the use of assets from the defense sector include a late 1989 decision to declassify some 2,300 defense R&D achievements,[39] to spur foreign sales of defense sector technology, and to issue the "Provisional Regulations for the Examination and Approval of the Export of State Secret Technology," on December 6, 1989.[40]

V. DISCUSSION AND ASSESSMENT

The Chinese experience with high-technology is perhaps poignantly illustrated by the following example. On April 16, 1990, the *Xinhua* news agency carried a brief note to the effect that the 27th Research Institute of the Ministry of Machine Building and Electronics Industry, in conjunction with the Zhengzhou Municipal Telecommunications Bureau, had successfully developed a new device,

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[33] Based on Zhang Binfu and Tang Juan. "An Excellent Start."

[34] Xiao Qinfu. "The Shortest Route To Two Way Development of S&T and the Economy." *Keji Ribao. (Science and Technology Daily).* December 25, 1990. In JPRS–CST–90–007. March 6, 1990.

[35] See, for instance, Di Naiyong. "Research and Development of Long March Family of Launch Vehicles." *Shijie Daodan Yu Hangtian. (Missiles and Spacecraft).* No. 137. September 1989. In JPRS–CST–90–007. March 6, 1990, p. 19.

[36] *Keji Ribao. (Science and Technology Daily).* February 4, 1989, p. 1.

[37] Xiao Qinfu. "The Shortest Route."

[38] See, *Ibid.*

[39] *China Daily.* January 24, 1990. In FBIS–CHI–90–018–S. January 26, 1990, p. 42.

[40] The text of the Regulations can be found in *Keji Ribao. (Science and Technology Daily).* December 30, 1990. In JPRS–CST–90–005. February 8, 1990, pp. 1–2.

> "for detecting unregistered or unauthorized fax users . . . This instrument can detect and record the telephone numbers of any unauthorized fax user transmitting fax messages through the public telephone network." [41]

This report calls attention to two very important features of Chinese high-technology development. The first is that most foreigners, indeed most Chinese as well, may never have heard of the 27th Institute, nor of many of the other, literally thousands, of government research centers which have developed outside the international purviews of cosmopolitan science and commercial technology. While their qualitative levels still remain uncertain, we are now better able, at least, to gauge the size of this reservoir of human talent. It is clear, that China has a very large technical community, with technical resources distributed widely across space, disciplines, and technologies. What actually goes on in this establishment, and how well it is done, remains only incompletely understood.

The achievements in Zhengzhou, however, also call attention to a more fundamental issue about Chinese technological development. During the mass demonstrations in China in the spring of 1989, we saw technological ingenuity being used by both demonstrators and government to advance their political agendas. The fax was a favorite tool of the demonstrators, while sophisticated imaging and intercept devices were employed by the government. When the achievement of the 27th Institute is seen in this context, the question of whose ends are to be served by new technologies is inescapable.

For the better part of 40 years, the best scientific and technological talent in China was harnessed to the service of the state. This produced a tradition of research and production capable of achieving successes in certain areas of strategic technology. But it also led to the bottling up of research results in laboratories, thus denying the civilian economy—*and* the military—of a regular source of innovation. While the defects of this system are now widely understood, both inside and outside of China, the events of the last year have more graphically called attention to how the fate of high technology in China is closely linked to the nation's political future.

International experience continues to accumulate in support of the view that national high-technology strategies cannot be based on a philosophy which puts technical assets, in the first instance, at the service of the state. The experience of poor, socialist China supports this proposition, as does the growing consensus that large commitments of technical talent to national defense projects places even the rich, capitalist, and democratic United States at a competitive disadvantage in high technology. The underlying lesson seems to be that a high-technology strategy which is cut off from competition in a mass market is ultimately unsustainable without enormous government subsidies.

A competitive mass market is not solely a matter of large numbers of consumers having increasing amounts of disposable incomes. It is also a matter of consumers and producers having genuine autonomy to use their resources as they see fit. That is, it is a matter of rights and liberties that are recognized and respected by the State.

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[41] In FBIS–CHI–90–078–S. April 23, 1990, p. 28.

China's reform policies of the 1980s clearly set in motion a process of economic and political liberalization. But as many observers have now noted, the extent to which economic change would call attention to the needs for political change was grossly underestimated, as we saw so tragically in Tiananmen. Less dramatic, but of direct relevance to the question of China's high-technology future, is how reform comes to affect the often subtle questions of rights and liberties pertaining to property.

The question of the ownership of productive assets had become increasingly pressing during the 1980s. Liberalization had made possible the proliferation of industrial activities outside the state sector. Many of these activities came to compete with state-owned enterprises, but for markets and (especially) for inputs. Absent a coherent property rights regime and protected economic liberties, this competition contributed as much to the growth of corruption as to economic discipline. For many reform theorists and strategists, changing the ownership principles for state enterprises had come to be seen as inescapable if the benefits of marketization were ever to be realized. In this context, the role of high-technology enterprises—as innovative means to the amelioration of long-standing problems of considerable national importance—occupied a special place. In continuing to force property rights questions to the center of thinking about reform, their special quality is likely to continue.

The need to confront the meaning and implications of property rights issues becomes unavoidable with the encouragement of high-technology enterprises, and the implementation of such programs as 863 and Torch. When an institute of the CAS spins off a new company, for instance, who owns its assets and who bears responsibility for their use? More import, who has the rights of appropriation over the profits it makes from new discoveries and products? [42] How will these rights be handled in a plan like Torch, which seeks to facilitate the transfer of research results to production? Are property rights sufficiently clear and assured to permit the kinds of risk-taking behavior which seems necessary for successful high-technology development?

China clearly has given thought to these issues. With the introduction of a patent system, and with commitments to strengthen trademark protection, relative to the pre-reform era, China has taken major steps toward modifying its property rights regime. As noted above, the government has begun to think about who will own the results of the 863 Program. The existence of the Technical Contracts Law, which deals mainly with unit-to-unit relations, provides some guidance for the Torch Program.[43] Recently issued "Interim Regulations on Strengthening the Registration and Administration of Science and Technology Development Enterprises" also try to clarify the rights and obligations of firms with different patterns of ownership. Equally important, China continues to recognize the existence of collectively and privately owned firms.[44]

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[42] The economic success of the Stone Company and the controversy surrounding it are closely related to ownership questions. Stone started with an investment of RMB 20,000 from the local government, but its fixed assets had grown to RMB 80 million, and it had RMB 1 billion in sales last year. To whom does all this belong?

[43] Zhang Binfu interview.

As further support for the idea of diversified ownership, the Haidian district in Beijing has initiated a new program for the provision of retirement and health insurance for personnel working in nonstate organizations, thus tackling one of the major problems of personnel management associated with the growth of the nonstate sector.[45] The Chinese Academy of Sciences, inspired by the example of the defense industry in Singapore and public corporations in Europe, has begun to experiment with the establishment of a holding company to manage shares issued by the many start-up companies being spun off by its institutes.[46]

Despite these developments and changes in attitudes toward property rights, China at present is committed to maintaining its socialist system. This will inevitably limit experimentation with ownership schemes to those within an acceptable ideological range, and keep in doubt the long-term viability of guarantees of nonstate ownership. China thus seems still quite some way from respecting those rights and liberties normally thought to be essential for the operation of a competitive mass market.

Unable to rely on demand from the domestic economy, the leaders of China's technological community have increasingly been focusing on international markets. Foreign relations, thus, become the other main area where the prospects for high technology are contingent on political direction.

China's "open policy" of the last decade, and the engagement with international S&T which it has made possible, have been of enormous importance for the revitalization of its R&D and for its high-technology development strategy. This is recognized by the leaders of the technological community. Although China is loathe to admit it, the international sanctions imposed following June 4, 1989 have upset planning assumptions for high-technology development. Joint venturing, technology transfer, and venture capital investments as important components for programs such as Torch, have become considerably more uncertain in the face of strained foreign relations *and* the inevitable cooling of business interest in the face of political uncertainty.

In the period since the Tiananmen events, Chinese orientation toward international S&T seems to show a curious combination of attitudes. On one hand, there has been a resurgence of technological nationalism, a proud reaffirmation of China's own technical capabilities won through self-reliance. On the other hand, there is also a sharpened sense of the importance of gaining access to international markets and to international cooperative research. These two orientations are nicely illustrated in domestic reactions to China's successful launch of AsiaSat, and they are also evident in an important, recently completed, two-year study of high technology conducted by SSTC, CAS, the Chinese Academy of Social Sci-

[44] See *Xinhua*. March 29, 1990. In FBIS-CHI-90-072-S. April 13, 1990, p. 21.

[45] *Xinhua*. January 10, 1990. In FBIS-CHI-90-018-S. January 26, 1990, p. 9. In the absence of insurance and housing opportunities on the open market, technical personnel were reluctant to make complete breaks with their state employers which had a monopoly on the provision of these welfare benefits.

[46] Interview with Hou Ziqiang, CAS, August, 1989.

ences, and the Commission for Science, Technology and Industry for National Defense. The study finds that China must,

- develop an economy oriented to the world market ..." which aims at the world market's high standards and high efficiency ...";
- ... take high tech industry ... as the leading forces, to the international stage ...";
- ... join the world network of high tech economy ...";
- ... give full play to China's advantages. China's research institutes have accumulated in recent decades a certain number of world-level scientific achievements which have potential commercial prospects. In addition, China has tens of thousands of scientists, businessmen and overseas students who are relatively familiar with contemporary frontier science and technology and economic management." [47]

The theme of high-technology internationalization was also sounded recently by SSTC Vice Minister Zhu Lilan, whose responsibilities include the 863 Program, in stating that the Program would seek expanded international cooperation. Zhu also called attention to the role of 863 in attracting China's overseas students back to China as a result of its contributions to improving the research atmosphere.[48]

There is, of course, another side to the relationship between China's high-technology development and foreign relations. China has been an exporter of strategic goods and technologies to nations of the world engaged in regional conflicts or those who aspire to regional power status. Its capacity as a supplier of strategic technologies will only increase as a result of its high-technology development commitments. China's high-technology development thus poses interesting challenges and opportunities for foreigners. It is of great international importance to continue to induce China to join in international regimes dedicated to the responsible use of strategic technologies in international commerce and foreign relations. But how this is done depends on the nature of domestic politics in China, and again, is related to the question of whose interests are served by technological development.

For some, Chinese behavior as a strategic supplier is more understandable if seen as the actions of a "wheeler-dealer" rogue military-industrial complex, rather than as the coherent and intentional foreign policy of a government. Control over the military industrial complex, while by no means unified, is thought to lie in the hands of those having family ties to China's senior leaders. The military industry is thus the source of considerable political influence as well as scientific and technological prowess. In this line of thought, inducing these relatives of the elite—members of the Chinese high-technology business community—with economic opportunities that are more attractive than destabilizing strategic exports may be a promising approach in the short run (short of a change in government) to securing China's international responsibility. More generally, the sooner a workable and acceptable formula can be found for harnessing China's technological resources to economic development and high-quality scientific research, the better for China and for the international community.

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[47] *Xinhua*. June,1990. In FBIS–CHI–90–117. June 18, 1990, p. 39.

[48] *China Daily*. June 13, 1990. In FBIS–CHI–90–116. June 15, 1990, p. 29.

Finding that formula is increasingly linked to China's domestic political evolution, a process which has a complex relationship with high technology. For reasons discussed above, significant political liberalization seemingly is needed if China's high-technology aspirations are to be met. Interestingly, given their involvement with high technology, the children of the old guard may have more of an interest in liberalization than is commonly assumed.

At the same time, if it is the case, as suggested above, that high-technology development carries an imperative to expand international contacts, induce institutional innovation, and keep property rights issues at the center of reform thinking, high-technology strategies can be a force for liberalization. Foreign governments and businesses can ultimately do little to determine Chinese political developments, but their continued engagement with China's high-technology programs can help orient these programs more toward economic growth than toward strategic exports. For foreign governments and for foreign companies who have found their dealings with China this past decade disappointing and exasperating, China's expanding commitment to high technology offers opportunities for a revised "China strategy."

CHINA'S ACQUISITION AND ASSIMILATION OF FOREIGN TECHNOLOGY: BEIJING'S SEARCH FOR EXCELLENCE

By Denis Fred Simon *

CONTENTS

Page

I. Introduction 565
II. Chinese Views of the Technology Transfer Process 566
III. A Stocktaking of Technology Import 572
IV. Technical Transformation of Enterprises 578
V. China's Assimilation of Foreign Technology 587
VI. Prospects and Conclusions 596

TABLES

1. Software as a Percentage of Overall Technology Imports, 1987–89 570
2. China's Imports of Foreign Technology, 1981–89 575
3. China's Imports of Machinery, Computers, and Related Items, 1987–89 576
4. Investment in Technical Transformation of Enterprises, by Sector, 1981–89 . 579
5. Technical Transformation of Key Items: Purpose, Use of Funds, and Type of Construction, 1981–89 582
6. China's Leading Television Manufacturers, 1989 7. Selected Examples of PRC Color TV Production Line Imports ....
7. Selected Examples of PRC Color TV Production Line Imports 594

FIGURES

1. Funding Sources for Technical Transformation, 1980–89 585
2. TV Set Production in China, 1978–89 593

I. INTRODUCTION

In August 1987 in Dalian, a major national conference on foreign technology import was held as part of an effort by Chinese leaders to review past policies and to identify whether or not China had indeed taken full advantage of its increased exposure to foreign technical know-how and equipment. The meeting was important because it provided a forum for a rather sharp critique of both the State Science and Technology Commission and the former State Economic Commission respectively for their ongoing policies and practices. Out of the meeting emerged a general agreement that new efforts would have to be made to ensure more effective and efficient assimilation of imported technology, and that perhaps it was time to consider creation of a special State Council-level organization to monitor and coordinate foreign technology acquisition. Even

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more significant, however, despite recognition that the open door policies of the previous several years had yielded substantial benefits, there was an apparent consensus that China had not made the best of its opportunities with respect to the importation of foreign technology and equipment.

The ideas and opinions that emerged from the Dalian meeting led to the issuance of a series of new policy guidelines in the latter part of 1987 covering technology import activities. These new guidelines have taken on added significance since the turmoil that occurred on June 4, 1989 in Tiananmen Square. In spite of the dramatic events associated with the political demonstrations in the square, the subsequent removal from power of Party Secretary Zhao Ziyang, and the imposition of economic sanctions as a protest against China's human rights policies by most of the industrialized nations, Chinese leaders have remained steadfast in their commitment to continue the country's "open policy" and to acquire foreign technology and equipment when and where appropriate. While many questions continue to surface within the highest echelons of the PRC leadership regarding the inflow of undesirable social and political influences—many of which are associated, directly and indirectly, with the borrowing of foreign technology—there does not appear to have been a fundamental retreat from the policies that have been in place over the last decade or so.

Yet, what is increasingly clear with respect to China's experience with managing and utilizing foreign technology over the last several years is that many of the same issues that were on the economic and political agenda during the initial period of the "great leap outward" have continued to plague the leadership. In essence, the contribution of foreign technology has been uneven at best. Technology acquisition has gotten caught up in the various problems associated with the overall program of economic reform, with the consequence being that a variety of distortions have occurred that have affected, in a rather negative fashion, the degree to which the PRC economy has been able to take advantage of the presence of modern equipment and advanced know-how. As a result, while articles extolling the contributions of foreign technology continue to appear in the Chinese press, an overall assessment of the place of foreign technology leaves one with a rather indeterminate set of findings. In some cases, the contributions of foreign technology have been appreciable and substantial progress has been made, e.g. the expanded application of advanced, automated machinery into the textiles industry and the introduction of quality control systems for the production of consumer electronics and automobiles. Yet, even acknowledging these gains, the reality is that progress has not been fast enough given the monies and level of effort expended, raising a number of critical questions about how to improve the existing system and how to better target enterprises that will have a higher probability of success with respect to foreign technology absorption and digestion.

II. CHINESE VIEWS OF THE TECHNOLOGY TRANSFER PROCESS

China's post-Tiananmen leadership continues to place a great deal of emphasis on the maintenance of the open door policy and the current policy of importing foreign technology and equipment. Underlying the PRC's continued willingness to rely on the import of foreign technology to support its modernization program are several factors. First, and perhaps most important, Chinese leaders continued to be concerned about the rapid development of high technology abroad and the growing linkages between economic, military and diplomatic influence, on the one hand, and advanced technological development, on the other hand.[1] Simply put, Chinese leaders remain fearful about falling too far behind the West in both qualitative and quantitative terms. It is estimated, for example, that over the next ten years, China will invest U.S. $2.1 billion in high technology development, which while being a substantial amount for China seems almost insignificant when compared to the current investments being made in the U.S., Japan, and Western Europe.[2] Second, Chinese leaders realize that their country lacks the domestic resources, financial and technological, to catch-up in a reasonably short period of time. Even taking into account current efforts such as the high technology-oriented "863" or TORCH plan, the only way to overcome the present shortage of ample resources is to utilize foreign technology.

This is not to suggest that Chinese leaders are particularly enamored by their need to depend on the global technology market for meeting internal technological needs. Self-reliance continues to be a high priority in China among the leadership. According to one commentary, "... the import of technology has not turned out to be a major tool for improving China's self-development capacity in science and technology." [3] From the perspective of the current PRC leadership, one of the most disconcerting and even distasteful aspects of the sanctions imposed by the U.S. in the aftermath of China's alleged missile sales to Saudi Arabia and Iran *and* the regime's actions in Tiananmen Square, was the ability of a foreign power to leverage its control over technology to get the Chinese to alter their behavior.[4] Still, China has little choice but to keep these channels open to overcome current production shortfalls and technological inadequacies.

And third, Chinese leaders remain committed to foreign technological borrowing because of the increasing entanglement of technology and national security issues. Even as the Cold War has wound down and the tensions on the Sino-Soviet border as well as on the Korean peninsula have moderated, China remains vitally concerned about maintaining its military strength. Foreign technology is needed to boost programs in microelectronics, computer-integrated manufacturing, advanced materials, etc.—all of which have applications and relevance for the country's defense-industrial base.

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[1] Feng Zhaokui, "High-Technology Competition in the 1990s," *Shijie Zhishi* [World Affairs], Number 10, May 16, 1990, pp.2–3.

[2] "New Emphasis on High Technology," *China Daily*, October 1, 1990, p.3.

[3] Yang Lincun and Qiu Chengli, "Major S&T Policy Issues to be Faced in the 1990s," *Liaowang Zhoukan* (Outlook Weekly), Number 19, May 7, 1990, p.41.

[4] There are rumors to the effect that spending for both civilian and military S&T science and technology increased appreciably in the aftermath of the Tiananmen crisis and the foreign sanctions against the PRC, as many Chinese leaders remained steadfast in their refusal to accept as a *fait accompli* the ability of outside powers to use China's need for foreign technology as a source of political leverage.

China's current concerns regarding technology transfer are reflected in the vocabulary that has emerged to describe the various facets of the process. The term "technology introduction" or "*jishu yinjin*" is used to describe the importation of foreign technology. On occasion, the term "*jishu zhuanrang*" is also employed, but in most instances, this refers to domestic technology transfer. A related term, "technical transformation" (*jishu gaizao*) refers to the upgrading of industrial enterprises through the introduction of both domestic and foreign technology and equipment. In formal discourse about the subject of technology transfer, the acquisition side is clearly distinguished from the assimilation side of the equation. The two key terms in this regard are "absorption" (*xishou*) and "digestion" (*xiaohua*). Both of these refer to the ability to make effective use of the imported technology once it is received by the recipient. Clearly, there is a sense, particularly in the aftermath of the Dalian meeting, that simple "importation of technology" is not enough to make a difference in terms of the projected contribution to economic development and national technological self-reliance.[5] Accordingly, sharp criticisms have appeared in various newspapers and journals regarding the country's poor performance with respect to absorption and digestion.

What is urgently required at the very least, according to current Chinese thinking, is an ability to utilize the technology fully and adapt it (*jishu shiying*) to local circumstances. Even more desirable is to have the foreign technology serve to catalyze some form of indigenous innovation (*jishu gexin*). According to official Chinese statements regarding the import of foreign technology, it is simply not enough to acquire and use the technology in one location; two things must occur for technology transfer to be considered successful. There first must be diffusion of technology (*jishu kuosan*) beyond the immediate recipient and secondly there must be increasing degrees of localization of production (*guochanhua*) of critical components or raw materials.

One of the major debates that has surrounded Chinese technology import policy has been the designation of just what constitutes the importation of technology.[6] Even though in 1981 when the "Interim Regulations on the Administration of Technology Introduction and Equipment Import" were adopted by the State Council and a formal distinction was made between import of "technology" versus import of equipment, the reality is that confusion continues to persist regarding just what is considered to be "*jishu yinjin*." According to the 1981 regulations, "the import of general machinery, electric machinery, electrical appliances, and instruments" are not classified as forms of technology import. The orientation of the regulations is clearly in the direction of distinguishing "software" (*ruanjian*) from hardware and equipment (*shebei*).

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[5] According to Chinese thinking, assimilation of imported technology and equipment includes the following: a) putting the imported technology into operation and reaching the planned output of the project; b) localization of the components and raw materials; c) research on and manufacture of the imported equipment through trial and/or batch production; and d) development and innovation regarding the imported technology and equipment. Interviews in Beijing and Shanghai, August 1987.

[6] Sun Quichang, *Jishu Yinjin Yu Xiandaihua* (Technology Import and Modernization), (Chongqing: Chongqing Publishing House, 1989). [in Chinese]

Yet, a debate has prevailed throughout the decade over whether or not imports of production lines, for example, are acceptable as a form of technology transfer. At the Dalian meeting in 1987, just to cite one example, officials from the State Planning Commission and the former State Economic Commission argued about the validity of pursuing "hardware" imports as a means to acquire technology since items such as a production line contain *embodied* engineering technology, manufacturing technology, etc." This position was quickly attacked by persons from China's State Science and Technology Commission, many of whom acknowledged the immediate benefits of "direct imports of productive capacity," but also stressed the limited potential for actual transfer of technology into Chinese enterprises. The debate has not ebbed whatsoever insofar as there continue to be those in China who believe that given China's mediocre S&T system, the best strategy, in the short term, is to concentrate on the import of production lines and assembly lines in order to manufacture higher quality, competitive products for both China's home market and for export.

The situation with respect to software versus hardware imports can be best appreciated by examining the statistics from the pre-1978 period and comparing them with the evolving situation since the open policy of the 1980s. From 1952 to 1978, approximately 97.7% of the contracts for technology import were for hardware, mainly focused on the import of complete plants and equipment. Perhaps the best examples of this policy orientation are the 156 industrial plants imported from the USSR in the late 1950s and early 1960s as well as the 20-plus petrochemical and fertilizer plants imported from Japan, Western Europe and the U.S. in the mid-1970s. By 1984, however, the value of software as a percentage of the overall value of contracts jumped up to almost 50%. Between 1981 and 1984, the contract value for software acquisition ranged around 30–50%. Since 1985, these figures have declined, falling to about 14% in 1989. This suggests that despite an initial surge in the mid-1980s, the current orientation seems to be more in the direction of hardware and equipment purchases.[7] (See Table 1).

One of the consequences of this still unresolved debate is that the statistical system for keeping track of technology imports is seriously flawed in a number of important respects. To begin with, different accounting systems are ostensibly used by the Ministry of Foreign Economic Relations and Trade (MOFERT), the State Planning Commission (SPC), the Chinese Customs Bureau, the Ministry of Finance, and the State Science and Technology System (SSTC). MOFERT only counts in its statistics formal contracts reviewed and approved by itself or its subordinate import/export corporations, such as the China National Technology Import/Export Corporation. The Customs Bureau does not have any systematic way to classify "technology" or "know-how" imports, and thus its calculations tend to be based on "hardware" imports and explicit fees paid for technology licensing only. In many instances, it can only account for expenditures that appear explicitly as "equipment" imports. In reality, many of the contracts for the purchase of machin-

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[7] Zhou Hongqi, "Pros and Cons of Technology Imports," *China Daily*, March 31, 1990, p.4.

TABLE 1

SOFTWARE AS A PERCENTAGE OF OVERALL

TECHNOLOGY IMPORTS, 1987-89

Unit: U.S. $ Millions

	LICENSE	TECHN SERVICE	CONSULT SERVICE	CO PRODUCTION	COMPUTER EQUIP	TOTAL
1987						
TECH IMP VALUE	350.87	15.59	10.19	509.95	2097.89	2984.89
SOFTWARE VALUE	166.98	5.76	10.01	14.56	261.39	458.70
% OF TOTAL	47.6%	36.9%	98.3%	2.9%	12.4%	15.4%
1988						
TECH IMP VALUE	476.58	14.24	27.51	10.04	3019.87	3548.26
SOFTWARE VALUE	294.48	14.04	18.20	4.53	345.11	676.79
% OF TOTAL	61.9%	98.6%	66.2%	45.1%	11.4%	19.1%
1989						
TECH IMP VALUE	148.45	38.45	6.18	6.58	2723.35	2923.00
SOFTWARE VALUE	69.81	11.52	5.90	2.01	328.49	417.74
% OF TOTAL VALUE	47.0%	30.0%	95.5%	30.5%	11.8%	14.3%

SOURCE: MINISTRY OF FOREIGN ECONOMIC RELATIONS & TRADE, BEIJING, 1990.

ery and related equipment, for example, contain provisions and fees for training programs and other related forms of "technology transfer." These amounts may never be calculated into the final statistics, or on the other hand, the entire "package" may be classified as a "technology import." In the MOFERT statistics, a distinction is now made to identify the exact proportion of the total contract value that can be considered "software."

Nonetheless, it still is unclear just what is or is not being included in the final calculations. When one takes into account the fact that most of the statistics being provided are for "central government" agencies and do not include the activities of local organizations, as well as the reality that many projects are divided into smaller components with their true intent obscured in order to avoid certain regulatory and administrative provisions, all of this suggests that the numbers being produced by the various agencies in the PRC government probably do not reflect an accurate picture of just what has transpired in terms of "actual" technology import.

Another dimension of technology import work that further causes problems derives from the absence of a formal system for approving, managing and coordinating the various tasks associated with the acquisition of foreign technology. MOFERT's responsibilities extend simply to the review and examination of the contracts associated with the import of foreign technology; it is not principally concerned with the choice of the technology or the selection of the supplier, though it may offer advice to the Chinese buyer in both instances. MOFERT merely ensures that the terms of each contract do not violate Chinese law and regulations. The State Planning Commission's role is somewhat more substantial insofar as it is concerned with defining the priority industries and technologies contained in the respective five year and annual economic plans. The SPC also is intimately involved in technology import activities by virtue of its responsibilities for overseeing the program for technical transformation, which frequently involves the acquisition of key equipment and technology. The State Science and Technology Commission's role in technology import work is actually very limited, especially since a great deal of its prerogative was surrendered to the SPC after the departure of former Minister-in-Charge Fang Yi in the early 1980s. The SSTC is primarily concerned with the long-term technological development of the country, and therefore, does not get involved in the nitty-gritty aspects of technology import work, except in an advisory capacity. It is here where one of the fundamental points of contention can be found between the SPC and the SSTC as the former is concerned with increasing the production capabilities and output of Chinese industry and agriculture while the latter focuses primarily on research. As a result, says one official, "the goal of technology import continues to be more linked to expanding production capacity and less concerned with the general advance of in Chinese technological development."

The essence of China's problems on the organizational side regarding technology import is that no one organization seems to possess an overall integrated perspective on technology import work. The situation has been greatly aggravated by the past decentralization of authority to local areas that has been part of the reform of the foreign trade system. According to an article in *Guoji Maoyi Wenti*, "the most serious problem with China's current policy of delegating authority for importing technology to lower levels is the lack of coordination between departmental and local levels." [8]

> The most urgently needed [measure] is the creation of a 'State Commission for Coordinating Technology Imports' to provide consolidated leadership, uniform legislation, and

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[8] Wang Suzhi, "Perfecting an Improved Technology Import Strategy," *Guoji Maoyi Wenti* (International Trade Journal), Number 4, 1987, translated in JPRS-CAR-88-004, February 12, 1988, p.53.

> strong macro-economic control over all technology importing activities. The current system of importing has failed since too many departmental-level bureaus, all lacking unified direction and acting independently, have been created to deal with different aspects of the problem. This loss of control at the departmental level is to blame for the tensions that have arisen both inter-departmentally and between the departments and local levels. [9]

In spite of the efforts by the central government to set up a multitiered review system to ensure that projects requiring major expenditures of scarce foreign exchange received adequate assessment, numerous mechanisms were devised to escape from these regulatory safety valves. This has meant that a great deal of duplication, and therefore waste of foreign exchange, has occurred because of inadequate controls on the behavior of local level organizations. In effect, many enterprises without sufficient engineering, management or technical skills were able to import production lines and technology. In many cases, the results have been deleterious as far as both the economic and technological interests of the country have been concerned, leading to much waste and under-utilized capacity.

According to recent criticism of the previous policies, unlike countries such as Japan and South Korea, China has lacked a master plan for technology import. As one source has suggested, "although the PRC has many special and specific technology import laws and regulations, [there] still [is] no authoritative and comprehensive basic law and our various special regulations are neither coordinated nor systematic . . ." [10] There is no explicit link between economic priorities and some type of blueprint for foreign technology acquisition. In fact, aside from the recent list of licensed commodities and products for export and imports, Chinese authorities have yet to produce a list of restricted, controlled, or prohibited technologies. As a result, this same source suggests, "the lack of provisions in our current legislation on the sphere of imported technology has caused us to import less technology for production than for services, less advanced than ordinary technology, and less technology for developing power and transportation than for concentrating on output value and efficiency." [11]

III. A STOCKTAKING OF TECHNOLOGY IMPORT

Between 1979 and 1989, Chinese entities signed over 4,700 contracts for the import of foreign technology, with a value of U.S. $36.4 billion.[12] As recorded by MOFERT, the quantity and value of technology import agreements peaked in 1986 when the total number of agreements reached 744 and the total contract value surpassed U.S. $4.45 billion. These increases reflect the expanded openness of the trading system, including the decentralization of decision authority to lower levels. Licensing and import of "complete sets of equipment (*chengtao shebei*) remain the predominant forms of technology acquisition. The number of licenses and complete sets of equipment imports both peaked in 1986, reaching 305 and 328 cases, respectively. While licensing is recognized as the preferred form of acquiring "technological know-how," however, foreign exchange limitations have led China to focus increasingly on foreign investment as its major mechanism for technology transfer. Heretofore, this has not proven to be the most appropriate strategy for China as many foreign partners in these ventures are investing in the PRC for access to the potentially large domestic market; most Chinese organizations seem primarily focused on technology transfer in these ventures, thus leaving both partners somehow dissatisfied with the outcome of their business collaboration. The category known as "complete sets of equipment" may constitute a whole plant, a single production line, or an integrated system of machinery and know-how to manufacture a particular type of product. In pursuing the import of technology, there continues to be a general tendency to shy away from excessive expenditures on both consulting and advisory services *and* technical services. In many instances, Chinese buyers of technology remain locked into the notion that "hardware" represents the only tangible proof that the recipient has actually received something for his money. While at various times, a consulting or technical service agreement may accompany a licensing agreement, the reality is also that few Chinese entities seem willing to pay for these kinds of "extras"; with a scarcity of foreign exchange, it is usually the "services" part of the contract that gets dropped if and when a financial crunch occurs, frequently leaving the recipient ill-equipped to handle the complex tasks of operationalizing and maintaining the various pieces of equipment. This tendency is compounded by the fact that intended Chinese purchasers of foreign technology tend to make their "buy decisions" on the basis of price rather than quality, which leads to purchases of "stripped down" or second-hand equipment without much in the way of technical support.

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[9] Ibid.

[10] Guo Junxiu, "Perfecting Technology Import Legislation," *Guoji Shangbao* (International Commerce), March 17, 1990, p.3.

[11] Ibid.

[12] MOFERT, *Almanac of China's Foreign Economic Relations and Trade, 1990,* (Beijing, 1990), p.48.

Over the last three years, the primary suppliers of technology to China in terms of value have been Italy (U.S. $1.71 billion), France (U.S. $1.25 billion), and Japan (U.S. $1.19 billion).[13] In 1989, China's purchase of foreign technology declined from U.S. $3.54 billion in 1988 to U.S. $2.92 billion (See Table 2). The decline was due to a combination of the sanctions imposed on China, including the fact that there was a 51% decrease in new foreign loan agreements, and the economic retrenchment program, which resulted in tighter policies regarding credit.[14] The largest single supplier was Italy, which provided China with technology and equipment with a value of U.S. $687 million, accounting for 23.5% of the total value of foreign technology acquired by the PRC. One interesting development has been the growth in technology imports from the USSR, which provided the PRC with technology and equipment worth U.S. $468 million, making the Soviet Union the second largest technology supplier to the PRC (in terms of value) in 1989.

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[13] Data used in the following paragraph come from the Ministry of Foreign Economic Relations and Trade (*Almanac of China's Foreign Economic Relations and Trade*) 1988, 1989 and 1990 editions (in Chinese).

[14] *China Economic Weekly*, January 29, 1990, p.4.

Another interesting development has been the fact that 74.3% of the monies used to engage in technology import came from foreign bank loans, which while representing a 16.6% drop from the previous year, still represents a substantial dependence on foreign capital.[15] In terms of the number of contracts, however, the picture is somewhat different. Between 1987–89, the U.S. accounted for the largest number of cases (279), while Japan was second (271 cases) and the Federal Republic of Germany was third (221 cases). In 1989, the PRC entered into a total of 328 contracts for technology import, a sharp drop from 581 contracts in 1987 and 437 contracts in 1988. Both Japan and Canada were responsible for the largest number of contracts, each having 52 (15.9% of the total number respectively).

Although neither the data issued by MOFERT nor the Customs Bureau contain statistics regarding formal technology transfers from Taiwan and South Korea, it should be noted that a substantial contribution is being made to the PRC by firms from these two economies. In the case of Taiwan, as many firms on the island gradually move many of their factory operations offshore—in industries ranging from textiles to consumer electronics—to Fujian and Guangdong to utilize cheap labor on the China mainland, they are providing considerable know-how to PRC enterprises in terms of quality control techniques, production scheduling, inventory management, product design, etc. Taiwan's links with the world market and its need to meet both the cost and quality requirements of its distributors and customers in the U.S. and Western Europe, have made it essential for its companies to assist many PRC enterprises upgrade their operations and master the basics of low cost, high quality manufacturing. The same can be said about firms from South Korea, which in their growing number of operations in both Shandong and southern China, are bringing their valuable experience to Chinese factories in way that may ultimately facilitate greater absorption on the part of the PRC. Obviously, the same also can be said about the activities of firms from Hong Kong as well, which through their assembly operations in Shenzhen and the other special economic zones, are helping to create an appreciable export-oriented, manufacturing base in the PRC.

From an industry perspective, it is clear that since 1978 the major beneficiaries of foreign technology have been the energy sector, the petrochemicals sector, the metallurgy sector and the telecommunications sector. According to MOFERT statistics, in 1988, the contract value for key technology import projects in three industries—energy, telecommunications, and raw materials—accounted for 56.3% of the total technology import contract value. In 1989, a similar picture emerges. Energy (27.4%), petrochemicals (16.4%) and chemicals (11.8%), and telecommunications (5.0%) ac-

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[15] It also reflects China's tight situation with respect to foreign exchange reserves. The central government in Beijing supplied only 2.7% of the foreign exchange needed to support technology import work in 1989. See "Work Regarding the Import and Export of Technology," *Economic Yearbook of China, 1990* (Beijing, 1990), p.III–209.

TABLE 2

CHINA'S IMPORTS OF FOREIGN TECHNOLOGY, 1981-89

Unit: U.S. $ Millions

YEAR(a)	LICENSES	CONSULT SERVICES	TECH SERVICES	CO-PRODUCTION	COMP SET EQUIP	TOTAL
1981-1984	294	28	59	36	209	726
	368.49	16.20	391.46	70.85	1,145.70	1,992.70
1985	291	21	30	34	295	671
	219.80	8.93	12.92	385.43	2,234.31	2,961.39
1986	305	31	46	34	328	744
	419.36	12.11	235.84	136.40	3,651.82	4,455.53
1987	235	24	30	25	267	581
	350.87	10.19	15.99	509.95	2,097.89	2,984.89
1988	169	19	27	10	212	437
	476.58	27.51	14.24	10.05	3,019.88	3,548.26
1989	96	14	13	11	194	328
	14,844	618	3,845	658	272,335	2,923.00

SOURCE: Ministry of Foreign Economic Relations & Trade, Beijing, 1990.

a. For each year or period, the first line (reading across) shows the number of cases of import subsidies; the second line shows the dollar value ($ U.S. Millions).

counted for the bulk of foreign technology and equipment acquisition. The situation regarding imported technology to support the technical transformation of enterprises program, however, reflected somewhat different priorities. The largest recipients by sector of foreign technology in terms of the number and value of contracts were the textile industry (16.9%), the electronics industry (6.2%), and the chemical industry (4.5%).[16]

As indicated previously, the data concerning foreign technology import into China does not contain statistics regarding the import of advanced machinery and related equipment. This data falls in the category of "trade statistics." Nonetheless, because China has spent considerable funds for the import of advanced machinery and equipment covered under the SITC Categories 7 and 8, it is important to consider this data and to somehow tie it into the overall technology imports (See Table 3).

The data indicate that China has added substantially to its industrial base over the last three years in terms of new productive capacity. The large increase in imports of both specialized and general machinery indicate that efforts are underway to replace, when

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[16] This allocation was consistent with the overall distribution of domestic funds as well. See *Almanac of China's Foreign Trade & Economic Relations, 1990* (Beijing, 1990), pp.50–51 (in Chinese).

TABLE 3
CHINA'S IMPORTS OF MACHINERY, COMPUTERS AND RELATED ITEMS, 1987-1989

Unit: U.S. $ Millions

MACHINERY			
EQUIPMENT IMPORTS	1987	1988	1989
POWER EQUIPMENT	56.7	104.1	136.5
SPECIALIZED MACHINERY	497.7	459.9	567.3
METALWORKING EQUIP	97.9	139.8	98.5
GENERAL MACHINERY	173.9	213.5	238.7
OFFICE MACHINES	72.2	69.0	64.9
TELECOMM/SOUND EQUIP	146.0	182.4	179.3
ELECTRICAL MACHINERY	159.3	230.4	239.6
ROAD VEHICLES	129.9	149.1	143.6
OTHER TRANSPORT	127.0	118.4	152.5
TOTAL MACHINERY	**1,460.6**	**1,666.6**	**1,820.9**
SPECIFIC EQUIPMENT AND INSTRUMENTS			
INSTRUMENTATION	86.3	81.8	81.6
PHOTO/OPTICAL EQUIP	43.2	36.5	39.8
TEXTILE MACHINERY	88.7	105.8	150.6
NC MACHINE TOOLS	9.2	9.5	9.5
TOTAL SPEC. EQUIP. AND INSTRUMENTS	**227.4**	**233.6**	281.5
COMPUTER			
DATA PROCESSING >16 BIT	5.4	2.7	3.5
DATA PROCESSING <16 BIT	18.7	18.9	16.3
COMPLETE CENTRAL PROCESSING UNIT	1.7	1.3	2.0
COMPUTER PERIPHS	NA	NA	14.8
TOTAL COMPUTERS	(25.8)	(22.9)	36.6

SOURCE: *China's Customs Statistics, 1988-1990* (Beijing, 1990).

possible, a good deal of the obsolete equipment that sits in many Chinese factories today. Of course, within the country's 400,000+ enterprises, that is no small task, especially given the huge strains on both the foreign exchange and domestic budgets. Still, it is clear that industries such as textiles have received a big stimulus by virtue of the new equipment entering into production. The data also reflect the strong and continued concern with modernization of the infrastructure, especially the energy and telecommunications sectors.

It also should be remembered that the statistics contained in this chart do not reflect any equipment, e.g. computers or machine tools, that might have been included as part of the importation of an entire production line. Taken together, these equipment purchases have not only added significantly to Chinese industrial production capacity, but they have also been responsible for improvements in productivity, quality, and product sophistication within selected industrial sectors. While it is true that there may not be much in the way of so-called *disembodied* technology and know-how that has been made available by the presence of this machinery in China's numerous industrial enterprises, the reality is that through reverse-engineering and other forms of technical learning, Chinese end-users as well as equipment manufacturers in the domestic machine-tool industry have benefitted from their intimate access to the various pieces of equipment.

China has also continued to engage in a broad-based program of scientific and technical cooperation with various countries in the developed and developing world. According to Song Jian, Minister-in-Charge of the State Science and Technology Commission, China has signed agreements with 57 countries and has cooperative relations with 108 countries and regions.[17] It has joined 187 international non-governmental science and technology organizations and has also become a member of more than 30 scientific and technological organizations under the United Nations.[18] In addition, China's S&T organizations have participated in more than 280 international academic organizations. The Chinese Academy of Sciences, for example, has signed cooperation agreements with counterparts in more than 50 countries and regions. Of the PRC's 340 sister-city relationships, approximately one-third are oriented toward science and technology collaboration. Taken together, these relationships not only give a boost to "science" and education in China, but also have broad implications for the modernization of the country's industrial technology base. A good example is the agreement signed in early 1989 between China and the FRG to set up three automation training centers in Beijing.[19] Under the agreement, AEG of West Germany will provide China's Ministry of Metallurgical Industry, Ministry of Coal Industry, and the China National Non-Ferrous Metals Industry Corporation with about U.S. $1.2 million in the latest automation equipment in coal mining and metallurgy as part of an effort to familiarize Chinese technical personnel with the latest developments in high-technology electric drive and process control equipment. Similar types of industry-oriented programs of cooperation have been developed with Japan, France, and Sweden.

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[17] "Song on Foreign Science Exchange," *Xinhua*, September 3, 1990, translated in FBIS-CHI-90-171, September 4, 1990, p.29.

[18] "International Science and Technology Exchanges," *China Economic Weekly*, June 7, 1990, p.10.

[19] "Beijing and Bonn Sign Automation Accords," *China Daily*, February 2, 1989, p.2.

IV. TECHNICAL TRANSFORMATION OF ENTERPRISES

In an effort to improve economic performance and rectify overall productivity problems in the industrial sector, Chinese leaders in Beijing have placed special emphasis on the technical renovation and upgrading of plant and facilities. In fact, one of the most salient aspects of the entire modernization program is the attention and resources that are being devoted to the "technical transformation of enterprises (*jishu gaizao*)" program (See Table 4). While many of the renovation efforts underway in China's provinces and municipalities do not seem to stand out from the perspective of size or scope, there remains little doubt that collectively they constitute one of the most important features of the modernization program. According to current statistics, about 1/3 of the investment in fixed assets during the past decade (1978–88) has been made for updating equipment and technological transformation.[20]

Four main activities have been associated with the ongoing program of technical transformation begun in 1981 under the 6th Five Year Plan.[21] First, there has been the "550 renovation projects" in the machine-building and electronics industry. A list of 550 key factories and research institutes was prepared as part of an attempt to identify the most critical entities requiring assistance in restructuring and upgrading. Second, there has been the program known as the "three transformations" within the textiles and light industries.

This program has been aimed at improving quality, variety and reliability of products with an eye toward increasing exports. Third, there has been the shift to civilian products in the defense industry. This has involved former military factories utilizing their specialized equipment and personnel to manufacture products for both the domestic market and export. According to one source, the proportion of civilian products manufactured by the defense industry jumped from 8.1% in 1979 to 66% of the value of total output in 1989.[22] And fourth, there has been the "12 dragons" project, which has been mainly aimed at localization of components and raw materials as well as improving the digestion and absorption of foreign equipment and know-how.[23] In industries such as electrical appliances and consumer electronics, e.g. televisions, where a large number of complete production lines had been imported, Chinese leaders have wanted to ensure that strong reliance on imported components and spare parts would not make China excessively dependent on foreign countries. In each of these four areas of activi-

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[20] Li Jingwen, "Promoting S&T Progress and Deepening Economic Structural Reform," *Renmin Ribao*, April 4, 1988, p.5.

[21] "Concentrate Strength on Doing Several Big Things," *Renmin Ribao*, November 25, 1990, p.2.

[22] Wang Jin, "Remarkable Achievements Made in Making Defense Technology Serve the National Economy," *Renmin Ribao* (Overseas Edition), September 6, 1990, p.1.

[23] "The Idea and Practice of Establishing China's Own Industrial System—The Dragon System," *Science and Technology Daily*, March 17, 1988.

TABLE 4
Investment in Technical Transformation of Enterprises by Sector, 1981-89
Unit: 100 Million Yuan

SECTOR	1981	1985	1986	1987	1988	1989*
INDUSTRY						
ELECTRONIC	6.70	20.01	21.99	17.48	24.21	22.87
SHIP BUILDING	NA	1.78	1.44	2.43	2.63	1.01
NONFERROUS METALS	16.54	41.17	60.14	79.23	99.28	92.52
COAL	13.01	25.31	29.69	31.94	34.67	43.10
PETROLEUM	26.69	11.84	13.62	15.54	29.69	25.95
PETRO-CHEMICALS	NA	9.49	12.40	19.32	22.03	26.32
CHEMICALS	13.31	28.81	38.62	52.60	85.32	74.73
POWER	7.38	13.51	17.75	21.87	27.84	27.87
MACHINERY	6.41	31.76	43.43	59.84	65.62	60.54
AUTOS	NA	5.56	5.88	7.92	15.73	16.19
BUILDING-MATTER	4.19	17.56	25.19	27.13	28.90	30.35
TEXTILES	17.77	38.40	53.77	65.25	92.91	59.75
LGT INDUST	22.84	55.97	74.86	88.14	108.32	110.72
OTHER IND	7.20	26.20	36.71	43.78	61.25	31.27
INDUSTRY	142.04	337.64	452.39	552.55	721.65	623.19
AGRIC	5.73	10.28	13.96	18.12	19.75	11.51
TRANSPORT/ TELECOMM	23.32	42.13	58.55	71.52	76.10	64.37
COMMERCE	9.27	22.40	32.23	45.76	52.23	23.37
URBAN CONS	7.70	21.81	40.39	43.57	51.33	36.44
OTHER	7.24	14.88	21.69	27.07	33.45	22.01
GRAND TOTAL	**195.30**	**449.14**	**619.21**	**758.59**	**954.51**	788.78

Source: *China Statistical Abstracts, 1989*, p.67; *Statistical Yearbook of China, 1990*, p.189.

*NOTE: Data for 1989 are compiled slightly differently from that for 1981-88, which may explain why, even taking into account the overall decrease in spending for 1989, the data available for the "other industries" category are relatively lower.

ty, a series of "special projects" was designated to receive targeted loans and related funds, including foreign exchange allocations, though by the latter part of the 7th Five-Year Plan, support for the program came out of a more general budget allocation that was somewhat less targeted (and therefore more susceptible to local distortion).

The issue of technical transformation takes on special importance from the perspective of technology import insofar as the Chinese hope to accomplish much of their technical upgrading and plant modernization through expanded contacts with foreign firms and industrial specialists. In fact, one of the primary reasons for adopting the open door policies now in place has been to attract foreign involvement in the Chinese economy. By relying on a variety of forms of foreign involvement, the Chinese have hoped that foreign participants would contribute their know-how, their production technology, and their managerial expertise to assist local manufacturing in becoming more efficient and effective producers.

There is little doubt that the task of updating production equipment, product designs, processing technologies, and testing and measurement capabilities constitutes a major undertaking. Surveys taken in the mid-1980s revealed that 10–20% of the equipment in industrial enterprises was from before the 1950s, 60% was from the 1950s and 1960s, and only 20–25% was from the 1970s and 1980s. Estimates suggest that 25% of the state-owned enterprises in the industrial sector require *complete* renovation; another estimate contends that 60% of the government-owned industrial equipment in state-owned enterprises needs to be replaced or renovated.[24] For example, while China possesses more lathes than any other country in the world, only 10% of them can be considered "state of the art." Moreover, due to the combined impact of Western export controls and China's own trade policies, much of the equipment has been sourced from different countries, leaving many factories with problems of equipment compatibility.

In essence, China's strategy for modernizing its domestic industrial technological capabilities is a multi-faceted one, reflecting a combination of top-down, market-oriented, and horizontal policy initiatives. The effort is under the direction of the State Planning Commission, which took over responsibility for the program when it merged with the former State Economic Commission. The current drive is largely characterized by the strong emphasis being given to both organizational reform and structural change—though it must be acknowledged that the Chinese have not entirely backed away from the "big push" approach to technological advance. At a March 1990 conference on the tasks for science and technology (S&T) development in the 1990s, Li Xu'e, Deputy Director of the Standing Committee of the SSTC, advocated the establishment of the chief-engineer responsibility system under the leadership of the enterprise director as a means to enhance technological development in industry.[25] In spite of the retrenchment efforts over the last year or so, the degree to which the leadership is prepared to initiate fundamental change in the technology area is still fairly significant. This commitment was first reflected in the March 1985 Central Committee Decision on "Reform of the Science and Technology Management System" and has been carried forward in the various other innovations that have been introduced, such as the technology market, the establishment of various "high technology zones throughout the country, and programs such as the Torch

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[24] "Industry Needs Big Technological Lift," *China Daily*, August 27, 1990, p.4.

[25] *Keji Ribao* (Science and Technology Daily), March 10, 1990, p.1.

Plan." [26] While the S&T reforms come at the technology problem from the R&D side, they are significant for industrial performance (and thus the State Planning Commission) because they spell out a broad array of modifications regarding the funding of science and technology activities, including the use of contracts to encourage R&D institutes and production units to develop more intimate working relations. Even more important, the reforms in S&T since 1985 serve to complement a number of other initiatives introduced over the past few years in the area of economic reform, e.g. the production responsibility system, and overall industrial policy,[27] many of which are aimed at encouraging enterprises to rely more on China's technical work force for helping with such tasks such as the assimilation of foreign technology.[28]

Propelled by a desire to gain expanded access to foreign technology, China has set in motion a series of acquisition programs to support the technical transformation program. During the period 1981–1989, China signed over 18,000 agreements and over 30,000 contracts for the introduction of technology and equipment to support the upgrading of Chinese enterprises for a total of over 415,000 projects. In total, the State pumped in 463.2 billion yuan (U.S. $ 98.5 billion). More than 17,000 projects involved the use of foreign exchange funds for the import of technology and equipment to support technical transformation. Estimates are that close to U.S. $27 billion was expended. In the 7th Five-Year Plan (FYP) itself, the State allocated a total investment of 276 billion yuan for technical transformation, but initial estimates are that the actual amount of investment for the first four years (1986–89) was over 314 billion yuan with one year still left to calculate. A report in the *Renmin Ribao* in mid-November 1990 indicated that the total figure will likely exceed 400 billion yuan.[29] During 1989, however, the total investment in technical transformation declined some 20% from 95.5 billion yuan in 1988 to 78.9 billion yuan (See Table 5). This was the first significant drop in investment level in this area since the program began, reflecting the severity of the economic crisis confronting the leadership and its need to introduce controls on spending due to two budget shortfalls and excessive subsidies to problem-plagued enterprises.[30] Approximately 1,300 of the projects required foreign purchases, and therefore an expenditure of foreign exchange, which apparently totalled U.S. $1.3 billion.

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[26] In spite of various problems, China's technology market continues to expand. In 1989, for example, the value of national transactions totalled 8.14 billion yuan, up from 72 million yuan in 1984. See *Xinhua*, September 3, 1990, translated in FBIS–CHI-90–171, September 4, 1990, p.28.

[27] Gao Shangquan, "Deepening Enterprise Reform Should be Carried Out in a Comprehensive Fashion," *Liaowang* (Outlook), Number 32, August 6, 1990, pp.5–6.

[28] One of the eight tasks proposed at the National Work Conference on Science and Technology in March 1990 was to encourage research institutes to play a more active role in importing technology and absorbing new technology. See *Keji Ribao* (Science and Technology Daily), March 10, 1990, p.1.

[29] "Important Strategic Thinking—On Strengthening Technical Transformation Among Enterprises," *Renmin Ribao*, November 13, 1990, p.1.

[30] Subsidies to unprofitable enterprises amounted to nearly 60 billion yuan (US$12.6 billion) in 1989 or nearly 20 percent of the government's annual expenditure. Early indications are that funds for technical transformation in the first half of 1990 continued to decline by 3.4%. "Industry Needs Big Technological Lift," *China Daily*, August 27, 1990, p.4.

TABLE 5
Technical Transformation of Key Items: Purpose, Use of Funds and Type of Construction, 1981-89
Unit: 100 Million Yuan

	1981-	1985	1986	1987	1988	1989
PURPOSE OF PRODUCTION						
SAVE ENERGY	7.79	17.37	22.75	25.90	30.77	25.25
EXPAND PROD	NA	160.35	211.20	273.26	375.30	303.08
INCREASE VARIETY	93.20	61.30	97.88	108.61	134.74	119.00
IMPROVE QUALITY	7.08	26.58	39.16	42.82	49.15	39.38
WASTE TREATMENT	2.98	9.08	11.78	14.33	17.67	14.99
OTHER	49.67	106.02	131.73	157.63	188.82	156.19
TOTAL	**195.30**	**449.14**	**619.21**	**758.89**	**954.51**	**788.78**
LESS NON-PRODUCT	34.58	68.44	104.71	136.04	158.06	128.57
TOTAL	**160.72**	**380.70**	**514.50**	**622.55**	**796.45**	**660.21**
USE OF FUNDS						
CONSTRUCTION	113.77	196.23	267.79	339.51	461.49	377.25
BUY EQUIPMENT	76.15	224.94	308.58	353.29	412.23	355.89
UPDATE EQUIPMENT	NA	58.36	88.85	119.99	89.33	55.64
CONSTRUCTION						
NEW CONSTRUCTION	19.75	23.06	36.26	41.22	69.72	38.87
EXPANSION	75.01	194.45	274.59	350.33	423.51	345.54
RE-BUILDING	89.02	191.16	261.84	313.18	386.43	363.49

Source: *China Statistical Abstracts, 1989,* p.71; *China Statistical Yearbook*, 1990, p.191.

As in the past, the basic framework of the program for the initial portion of the 7th FYP was laid out in a list of 3,000 key items (actually the number ended up totalling 3,900 items) designated by the SPC (by components of the former State Economic Commission) for purchase during the 1986–88 time period. As noted, these items placed the import of technologies to support the technical transformation of enterprises in the forefront—with the State Planning Commission and its local counterpart organizations—still being the lead unit in this effort. Most of the focus is on the import of *know-how,* with emphasis on technologies in the electronics and machinery area. While technology imports are not confined to this 3000 item list, the list does appear to contain the priority items.

The salience of the so-called "3,000 projects" list can be seen in a recent Chinese assessment of the impact of those technologies imported under this program during the last three years of the 6th FYP. According to the evaluation, which was made in late 1986, "the 3,000 projects have enabled some Chinese industries and products to leap-frog technically, significantly narrowing the gap with the advanced nations. Ten percent of the products of the machinery industry today reach international standards of the late 1970s and early 1980s. In electronics, the manufacturing of color TV sets, video cassette recorders, tape recorders and copiers has grown and matured. More than 30 percent of [our] electronic products are now on par with the best of the world in the late 1970s and early 1980s, up from 15% in 1982." [31] While perhaps somewhat over-optimistic in its tone, the assessment reveals the critical value that such a program could have if properly supported and managed, especially since, as the source suggests, "these projects require limited outlays, have a short construction period, pay off quickly, and yield good economic results." [32]

Improved use of foreign technology has been made possible, in many cases, by the fact that acquisition mechanisms have been created at the enterprise level with the establishment of so-called "technology introduction or import departments." In many cases, these departments were created on an ad hoc basis to handle the process of technology import. Subsequently, they have been formally institutionalized and are now a permanent part of the Chinese enterprise. Their primary value is that they constitute a critical mass of individuals responsible for all facets of an import-related project. In some instances, in addition to having a small core staff, there is a rotating staff of technical and financial specialists that move in and out of the office as needed during the inception, negotiation, agreement, and implementation phases of particular projects. Enterprises are now responsible for preparing in-depth feasibility studies to justify not only the need for the purchase, but also to indicate their capabilities and resources for effectively implementing the new technology. The increasing reliance on loans to finance technical transformation projects has also helped to ensure greater success in the various projects, especially since enterprises are now responsible for paying back the monies they use for upgrading their facilities, buying new equipment, etc. In 1989, for example, only 1.8% of the total funds allocated for technical transformation came from government grants, 57.3% was from self-investment, and 40.9% was derived from domestic and foreign bank loans

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[31] Jiang Shaogao, "3,000 Pieces of Technology Imported in 3 Years," *Renmin Ribao* Overseas Edition, December 4, 1986, p.3.

[32] Ibid.

(See Figure 1).[33] Total funding for technical transformation increased from 18.7 billion yuan in 1980 to 78.9 billion yuan in 1989.

Accordingly, it is clear that China's enterprises covered under the technical transformation program have begun to benefit substantially from the growing presence of foreign technology in the local economy. First, it is estimated that large amounts of both domestic funds and foreign exchange have been saved. According to one estimate, approximately U.S. $11 billion in foreign exchange will have been saved by import substitution associated with the technical transformation program. Chinese analysts claim that 45% of the increase in China's exports of light industrial goods, textiles and machinery over the last several years has been achieved through the upgrading of old workshops with imported technology and equipment.[34] In the city of Shanghai, where approximately 25 billion yuan (U.S. $4.9 billion) had been invested in technical transformation, of the 725 projects completed between 1986–88, more than 14 billion yuan in production value has been generated and close to 900 million yuan in foreign exchange earned.[35] Second, in the electrical appliance area, for example, product quality and designs have been greatly improved. A good example is the Yingkou Washing Machine Factory in Liaoning Province, which after extensive cooperation with a Japanese firm—including the completion of two large scale technical upgradings and the set up of 22 computerized production lines, now produces seven models of washing machines. In the chemical industry, the Luzhou Natural Gas Chemical Company in Sichuan used a World Bank loan, in conjunction with assistance from the UK-based firm H&G Engineering, to update its production techniques and increase its output capacity.[36] After its three-year program of technical renovation, the Luzhou company's daily 300 metric ton output of synthetic ammonia was increased to 450 metric tons. Moreover, energy consumption was sharply reduced. And third, according to one study of imported technology and equipment which have been put into operation in Beijing, Shanghai, and Tianjin, each yuan of investment in imported technology for technical renovation has increased output value by 2.5–2.8 yuan.[37]

This is not to suggest that the technical transformation of enterprises program has been without its problems. The most significant problem continues to be the general reluctance of many enterprise managers to give a high priority to technical transformation as well as overall technological progress. According to one article, Chinese managers are said to lack the three main ingredients necessary for promoting technological advance: 1) a strategic vision and strong enterprising spirit; 2) the courage to take risks and be a pioneer; and 3) a high level of scientific culture and strong aptitude for management. "Currently, many factories and enterprises are

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[33] "The Situation Regarding China's Investment in Fixed Assets," *Economic Yearbook of China, 1990* (Beijing, 1990), p.II-35.

[34] "Foreign Technology Purchases Pay Dividends," *China Daily*, August 29, 1989, p.1.

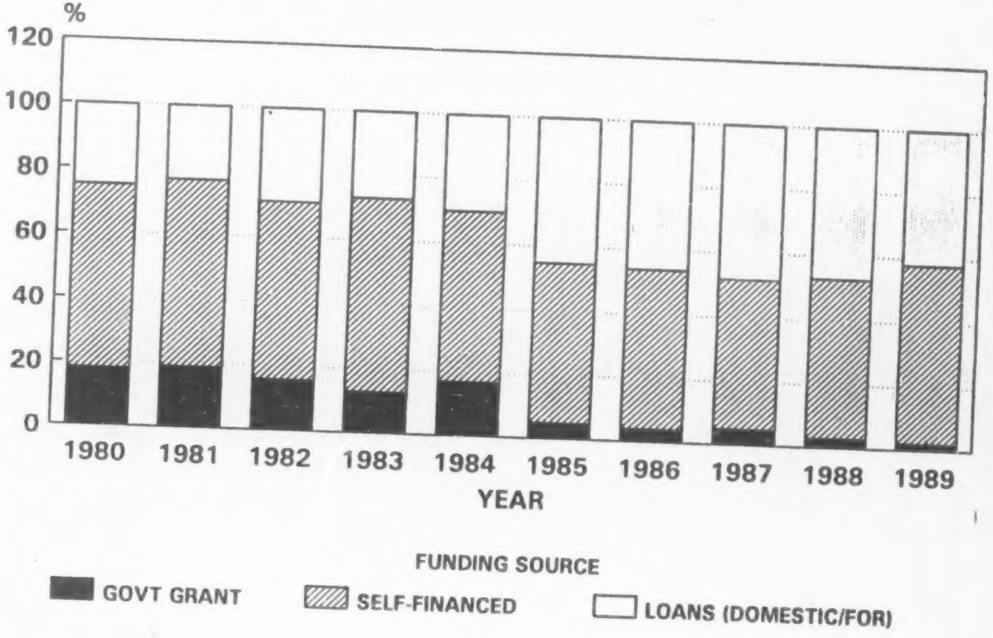
[35] "Renovation Projects to Bring Industry Up-to-Date By 1995," *China Daily*, (Shanghai Focus), December 10, 1990, p.1.

[36] "Renovation Completed at Chemical Complex," *China Daily*, November 27, 1990, p.2.

[37] Wang Xiaodong, "Results and Prospects for China's Technology Imports," *Liaowang Overseas Edition*, No.1, January 5, 1987, pp.13–14 translated in JPRS–CEA–87–014, February 26, 1987, pp.53–54.

Figure 1

FUNDING SOURCES FOR TECHNICAL TRANSFORMATION, 1980-89



UNIT: % OF TOTAL

lukewarm in the pursuit of technological progress, ... an important reason is that many leading cadres and departments in charge do not take the evaluation of technological progress in enterprises seriously.... Many enterprise leaders pay no attention to technological progress precisely because the higher levels' demand for such progress is a soft criterion." [38]

As a result of the above-mentioned situation, there has continued to be a tendency among industrial enterprises to use funds designated for "technical transformation" for primarily capital construction. While after 1985, the funds used to purchase and update equipment exceeded those used for construction, the fact remains that between 40–50% of the funds are used for some form of construction. While some new construction is to be expected given the dismal state of China's industrial facilities, this problem is part of the general inability of the central authorities to control spending effectively outside the plan. Between 1986–88, for example, out of total investment of 23.25 billion yuan for technical transformation in the machinery and electronics industries, only 7.85 billion yuan (about 1/3) was budgeted within the plan.[39] And, while the austerity program inaugurated in 1988–89 did help reduce the severity of this problem, it promises to reemerge once the controls are removed. And last, the largest expenditure of funds continues to be used for the purpose of expanding production, many times through expansion of existing facilities rather than actual upgrading. Funds for the purpose of increasing variety and improving quality do not generally equal or surpass those allocated for production expansion. As one source in *Jingji Ribao* suggests, this leads to the enactment of what are simply extensions of low-standard projects rather than new initiatives based on a thorough restructuring of the prevailing production system.[40]

CHINA'S TECHNOLOGY IMPORT PRIORITIES

Based on the conclusions reached at the Dalian meeting in August 1987, the State Council approved a series of recommendations concerned with improving the results of technology importation.[41] During the last three years of the 7th Five Year Plan, these recommendations became the foundation of China's revised technology import policy. Enacted with the help of the former State Economic Commission, a five-point preferential policy package was introduced and was applied specifically to 300 key projects ("300 dragons") identified by the commission as central to China's economic modernization.[42] The five points included the following provisions: 1) the product or value-added tax will be reduced or exempted on items produced with foreign technology that have replaced imports; 2) buyers of items produced with foreign technology may be asked (with approval by the State Administration of Exchange Control) to pay some foreign exchange when purchasing such products on the domestic market; 3) import duties and product tax may be reduced or exempted for import of items that are difficult to manufacture in China, but are critical to economic modernization; 4) central government departments and local governments are responsible to give the 300 projects advantages in foreign exchange, bank loans, supply of materials, etc.; and 5) enterprises that complete the absorption and digestion of the imported technology and increase localization will be eligible for special rewards or bonuses. Taken as a whole package, these new provisions are designed to stimulate interest in foreign technology acquisition, while at the same time providing incentives for successful absorption. The emphasis in the revised policies is clearly and unequivocally on improving "digestion and absorption" of imported technology.

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[38] Gu Jiekang, et.al., "How to Make Enterprises More Desirous of Modern Technology," *Zhongguo Keji Luntan*, Number 2, 1988, pp.36–38.

[39] He Guangyuan, "More Regulation and Control of Machine-Building and Electronic Industries Urged," *Jingji Ribao*, September 22, 1989, p.2.

[40] Ibid.

[41] "State Council Policy on Imported Technology," *Xinhua*, November 20, 1987, translated in FBIS–CHI–87–226, November 24, 1987, p.29.

[42] Zhang Yuan, "Preferential Policy Begun for Imported Items," *China Daily*, February 4, 1988, p.2.

Even though China will continue to adhere to its policy of economic consolidation and rectification for the next 1–2 years, the emphasis on technology import will not subside. In keeping with the above principles, during the 8th Five Year Plan, China will place emphasis on the following areas: 1) high technology—as a means to help facilitate the formation of a batch of research centers in such fields as high-energy physics, microelectronics, computers, biotechnology, ocean engineering, and new materials; 2) key technology for enhancement of the economic infrastructure, including energy, communications, raw materials, and agriculture; and 3) new techniques, materials and equipment that can boost the quality of export products.[43] According to Xie Yangan, deputy director of the Foreign Economic Relations and Trade Office of the State Planning Commission, the emphasis will be on the acquisition of design and manufacturing technologies that will help promote the development of new equipment and products as well as enhance the overall competitiveness of Chinese exports.

These priorities will also be reflected in the guidelines for technical transformation for the 8th Five Year Plan. Approximately 300 large and medium key enterprises will form the focal point for the program.[44] Three main tasks have been delineated for the technical transformation program a) reduction of energy use and consumption of raw materials; b) improvement in the quality of products and development of new products; and c) expansion of exports and an increase in foreign exchange earnings.[45] In all likelihood, funding will increase overall, though during the initial period, there may be a slight decline due to prevailing economic conditions. According to officials at the People's Construction Bank of China, hard currency loans will mainly go for technical renovation projects in key industries, including energy, transportation, raw materials, light industry, and textiles.[46]

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[43] "More Foreign Technology Needed," *Beijing Review*, March 12-18, 1990, p.39.

[44] Qin Hanshan, "China's High-Tech Development," *China Market*, Number 4, 1990, p.17.

[45] "Important Strategic Thinking—On Strengthening Technical Transformation Among Enterprises," *Renmin Ribao*, November 13, 1990, p.1.

[46] "China To Go Ahead with Tight Credit Policy," *China Daily*, October 30, 1990, p.2.

V. CHINA'S ASSIMILATION OF FOREIGN TECHNOLOGY

The central focus of attention regarding technology import in China has shifted away from primary concern with issues such as U.S. export controls and COCOM and is now aimed at the question of assimilation. This is not to suggest that Chinese officials remain fully satisfied with the degree to which China still falls under American export control restrictions. For example, the PRC leadership was obviously not pleased with the decision of the Bush Administration to force China's National Aero-Tech Import and Export Corporation (CATIC) to sell its interests in MAMCO Manufacturing, a Seattle-based producer of aircraft parts, due to "national security" concerns.[47] Nonetheless, after spending several billions of U.S. dollars for imported equipment and know-how, Chinese officials are seeking ways to ensure that previous deficiencies are eradicated. As noted, there remain a range of opinions regarding the effectiveness of previous efforts at absorption of foreign technology. Some official statements suggest that as much as 90% of the cases involving technology import have yielded "desired results." Other more pessimistic analyses, for example, indicate that the number of so-called "success" cases may be less than 50% and even as low as 20%.[48] For example, in a review conducted in 1987, out of 996 cases of technology import in the machine-building industry carried out between 1975–86, only 210 cases (21%) can be considered under full operation.[49]

Clearly, some progress has been made. According to an official from the State Planning Commission, as a result of technology imports over the last decade, China has been able to expand steel production annually by 15 million tons, copper by 90,000 tons, aluminum by 1.5 million tons, ethylene by 900,000 tons, synthetic fiber by 1.1 million tons, and cement by 4.8 million tons.[50] Improvements in management, manufacturing technology, and personnel utilization have all helped to eradicate some of the previous problems of the late 1970s and early 1980s. The successful startup of the 300,000 ton ethylene project in the Shanghai Petrochemical Complex is one such example.[51] With equipment and know-how imported from Toyo Engineering of Japan, this project will provide China with the capacity to produce 1.3 million tons of petrochemical products per year. This project is the last of four such installations China imported from Japan in 1978. The other three projects are in Daqing (Heilongjiang), Qilu (Shandong), and Nanjing (Jiangsu).[52] Originally, this installation had been placed in Nanjing, but in 1983 it was transported to Shanghai. Unfortunately, while sitting idle in Nanjing, many problems arose, such as corrosion of the pipes and meters. Repair of these problems cost a considerable sum of money. Nonetheless, with the help of experts from the three other facilities, the plant was finally able to complete a successful test run in December 1989.

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[47] "Bush Orders Chinese Firm to Sell Stake in US Aircraft-Parts Maker," *Asian Wall Street Journal Weekly*, February 12, 1990, p.19. Some have suggested, however, that the Bush Administration's decision, which was authorized by the 1988 Omnibus Trade Bill, had very little to do with actual national security concerns, but rather was a reflection of the tense bilateral political climate induced by the events in Tiananmen Square. See Keith Eastin, "China Case Highlights a Flawed US Law," *Asian Wall Street Journal Weekly*, April 2, 1990, p.14.

[48] Song Zhuci and Hong Lujian, "Strengthening the Macro-Mechanisms for Machinery Technology Import," in *Industrial Policy Research on China's Machine-Building Industry* (Beijing: Machine-Building Industry Press, 1989), pp.259–271.

[49] Ibid.

[50] "Foreign Technology Purchases Pay Dividends," *China Daily*, August 29, 1989, p.1.

[51] "New Plant Sets Record," *China Daily*, December 18, 1989, p.1.

[52] "Petrochemical Trade Prospers," *China Daily*, October 16, 1989, p.4.

Similar gains have been made in the turbogenerator industry, which has been a high priority sector since the 1950s.[53] Between 1953–58, China established two large manufacturing bases for turbo-generator production; one is in Harbin which imported Soviet technology and the other in Shanghai which relied on technology obtained from Czechoslovakia. The principal means of acquiring technology was through imitation. Between 1958–80, the PRC entered a period characterized by the emphasis on self-reliance. Through indigenous efforts, Chinese engineers were able to master some of the key water and hydrogen cooling technologies, circulation techniques, rotor balance and speed calculations, and stator and rotor coil water systems.[54] Between 1980 and 1985, China entered its current open door phase and signed 13 agreements for acquisition of generating equipment manufacturing know-how. Included in these 13 agreements signed by the PRC was a February 1981 15-year agreement for importing technology from Westinghouse to upgrade the quality of Chinese turbogenerators in terms of parts and components as well as overall performance.[55] Through these imports, which included a substantial element of joint design and production work between Westinghouse and the relevant Chinese entities, Shanghai and Harbin have been able to perfect near state-of-the-art techniques to procure the 300MW completely hydrogen inner cooled generator and the 600MW hydrogen and water cooled generator, respectively. The availability of this technology within China has saved substantial foreign exchange, and has also contributed in a big way to helping China improve its hydropower generating capacity.[56]

Still, assimilation problems abound. One of the more revealing cases involves the Yunnan Tobacco industry, which over the past several years has invested 750 million yuan and expended U.S. $140 million in foreign exchange to import one tobacco leaf composite flue-curing production line (600,000 boxes annual capacity), seven cut tobacco-making production lines with an annual capacity of 2.4 million boxes, 187 cigarette rolling units with an annual production capacity of 1.96 million boxes, and 123 packaging units with an annual production capacity of 800,000 boxes.[57]

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[53] Shen Liangwei, "The Status of and Prospects for Turbogenerator Manufacture in China," *Dadianji Jishu* (Large Electric Machines and Hydraulic Turbines), Number 6, November 1986, pp.1–9.

[54] Ibid.

[55] For a discussion of China's ability to produce the materials and metals needed to manufacture turbine rotors and blades see Sun Huilian, "Material Technology Progress in the Power Equipment Industry," *Dongli Gongcheng* (Power Engineering), Volume 9, Number 2, April 1989, pp.14–24.

[56] This is not necessarily to suggest that China's turbogenerators are without their problems. Nor is it to suggest that China's power problems have been resolved. For an overview of the current situation see Zhu Chengzhang, "Achievements, Problems and Countermeasures in China's Electric Power Industry," *Keji Daobao* (Science and Technology Review), Number 30, March 1990, pp.3–6.

[57] Zhang Kaihan, "Digesting Imported Technologies and Raising the Equipment Utilization Coefficient," *Yunnan Ribao*, April 15, 1990, p.2.

On the surface, the project appears to have been a success, especially if we measure the performance of the technology in terms of increases in economic output. Compared with 1981, for example, Yunnan's cigarette output reached 3.5 billion boxes (3.4 times that of 1981); the imported equipment accounted for about 50% of the increase. The value of the output was 3.7 times that of 1981, taxable profits were 4.29 billion yuan or 7.6 times that of 1981, and the output of filter-tip cigarettes was 1.42 million boxes or 20.8 times that of 1981—95% of which was produced on imported equipment.[58]

Based on Chinese assessments of the project, however, certain shortcomings were revealed. First, despite the rapid increases in output, the fact is that the efficiency of imported equipment is much lower than that of equipment made in China. The average production efficiency of the main tobacco machines and equipment in Yunnan is 75%; equipment made in China has an 89.41% rating, while imported equipment has a rating of 51.04%. Overall, compared with the efficiency levels in the U.S. and Europe, Yunnan's imported equipment has not yet reached the 40% level. Since the technology imported from abroad (West Germany) is more complex than the domestically-made machinery and has different maintenance and material requirements, Chinese workers feel much less comfortable with using it. "... because the technical level of operation is low, the daily maintenance and care of equipment is not good, the quality of raw and supplementary materials does not meet requirements, and the work environment for the equipment is bad—all of which has accelerated the wear and tear on and the aging of the equipment. The supply of spare parts is not timely enough, the equipment's maintenance technical standards and data are not complete, there is lack of high-quality technicians who have been systematically trained and can correctly adjust and maintain the imported equipment, there is pressure from heavy production tasks, and so forth." [59]

The situation with respect to Yunnan's import of tobacco processing equipment and technology appears to derive from the number of rather generic problems. First, there has been an excessive focus on technology importation and not enough attention given to digestion and absorption. The tasks of complete digestion and absorption have not been made a high enough priority by the plant managers. If Yunnan's tobacco industry can increase the effective utilization rate of the imported cigarette-making and packaging equipment by 10% over the next year or two, it could reduce future outlays of foreign exchange by U.S. $12.6 million and add 64.33 million yuan in taxable profits to the state. Second, not enough time and attention was given the problem of training. Third, the industry lacks much of the support structure to keep it alive and operating efficiently. There are an inadequate number of repair plants and parts supply centers to sustain the industry. Fourth, the operating environment for the equipment needs to be improved to avoid constant equipment breakdowns. Relatedly, there frequently does not exist some form of "equipment management responsibility system" to ensure that the imported items are not just operating effectively, but are fully incorporated into the mainstream operations of the entire production endeavor.

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[58] Ibid.
[59] Ibid.

The types of problems found in Yunnan's tobacco industry are indicative of those found elsewhere in the PRC. As noted, requirements exist for the preparation of comprehensive feasibility studies by intended foreign technology recipients. These feasibility studies, which are reviewed by the local economic and/or planning commissions as well as the relevant banks if a loan is involved, oblige the enterprise to specify the nature of the technology being sought, the appropriateness of the supplier, and the competence of the enterprise in terms of management, equipment and personnel, to make effective use of the imported items. However, while funds are made available for the acquisition of foreign know-how and equipment, there rarely is a budget set aside for covering the costs of assimilation. One of the major failures heretofore has been the lack of direct participation by China's scientific and technical R&D institutions in the digestion and absorption process.[60] As one source has indicated, "... institutions of higher education and scientific research units, China's main forces in scientific research, are cut off from digesting absorbing and innovating work." [61] Lacking appropriate incentives, neither the technology recipients, nor the R&D institutes seek out one another on a regular sustained basis. A sample survey of 620 items imported by China between 1973–86 showed that scientific research units were called upon to help with the assimilation of foreign technology in fewer than 2.0% of the cases! [62] Ironically, however, when such organizations do come together, the results are not necessarily optimal, as those who are responsible for R&D frequently tend to push up the level of know-how and equipment being demanded from the foreign supplier beyond the capacity of the recipient to utilize the technology.

Assimilation problems are also manifested in the serious situation regarding duplication of technology imports. While some in China claim that the country's problems with redundant technology imports stem primarily from the poor macro-economic management and oversight system, others argue, quite persuasively, that the main cause is related to the lack of adequate absorption and digestion. Since the demands of the domestic market cannot be satisfied by importing merely one set of equipment (because of poor performance with technology absorption), other potential suppliers quickly jump in to secure their share of the market. The validity of this argument is supported by several studies conducted by the National Research Center for Science and Technology for Development under the SSTC. According to one study conducted within the machinery and electronics industry, market competition was stated as the driving force behind the desire of various enterprises to advance their technical levels.[63] This may sound ironic in an economy that supposedly relies on the planning mechanism for formulating and implementing economic policy. Still, whether perceived or real, enterprise managers do have a sense of their participation in China's so-called "big market." Moreover, despite the admonition to focus on exports, the primary motivation for technology imports among Chinese enterprises has continued to be access and share in the domestic market in China.[64]

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[60] Theodor Leuenberger, ed., *From Technology Transfer to Technology Management in China* (Berlin: Springer-Verlag, 1990).

[61] Hu Jiexun, "On the Role of Institutions of Higher Education and Scientific Research Units in Digesting, Absorbing, and Innovating Imported Technologies," *Keyan Guanli* (Research Management), Number 2, March 1989, p.14–18.

[62] Ibid.

[63] Bao Ke and Zhou Weimin, "The Assimilation of Imported Technology in the Machinery and Electronics Industries," *Jingji Cankao*, January 21, 1988.

Perhaps the sector where redundant imports have been the most distressing has been in the television industry, where estimates suggest that at least 113 production lines for color TV assembly and production were imported.[65] The total capacity of these lines is over 15 million sets. Approximately 51.0% of China's urban residents have a color television set; the percentage among families in the rural areas is about 4.0%.[66] Total TV production reached 27.7 million sets in 1989, 34% (9.4 million) of which were color televisions (See Figure 2 and Tables 6 and 7). Aside from the obvious problems of duplication and perhaps under-utilization resulting from excessive production capacity, the main problem associated with these 113 production lines is that the depend primarily on imports for key parts and components. For example, a television plant in Jiangsu Province with a capacity to produce 175,000 color TVs a year can only manufacture 5,000 sets because of its limited foreign exchange.[67] In 1988, one study estimated that 85–87% of the tubes needed to be imported for the 10.28 million color TV sets produced.[68] Similar foreign exchange issues have emerged with respect to semiconductors, integrated circuits, and printed circuit boards used in the manufacture of color TVs. From an overall perspective, despite concerted efforts to revitalize the domestic semiconductor industry and build up production capabilities in places such as the Caohejing High-Technology Zone in Shanghai, estimates are that anywhere from 50%–70% of the internal market demand for ICs is still met through imports.[69]

To remedy the situation, Chinese leaders have given a high priority to the localization of key components. Official estimates are that China can now produce 90% of the supplementary components for TV sets, reducing the cost of imported components from U.S. $60 to U.S. $20. The two most important primary components, i.e. color picture tubes and integrated circuits, are currently the target of major investment activities. In the case of the latter, the major project initiated to overcome the domestic shortfall of TV set integrated circuits (ICs) was the import from Toshiba of a complete IC production line by the Jiangnan #742 Radio Equipment Factory in Wuxi in the mid-1980s.

In addition, with improvements in domestic production techniques, China can provide many of the less-complex linear ICs used in television manufacturing. The government has also chosen to

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[64] Denis Fred Simon and William A. Fischer, *China's Experience with Foreign Technology* (New York: Ballinger/Harper and Row, forthcoming).

[65] "China's Television Receiver Industry Developing in a Beneficial Direction," *Zhongguo Dianzi Bao* (China Electronics News), March 31, 1987, p.2.

[66] "Sluggish TV Sales Expected to Boom," *China Daily* (Business Weekly), June 4, 1990, p.2.

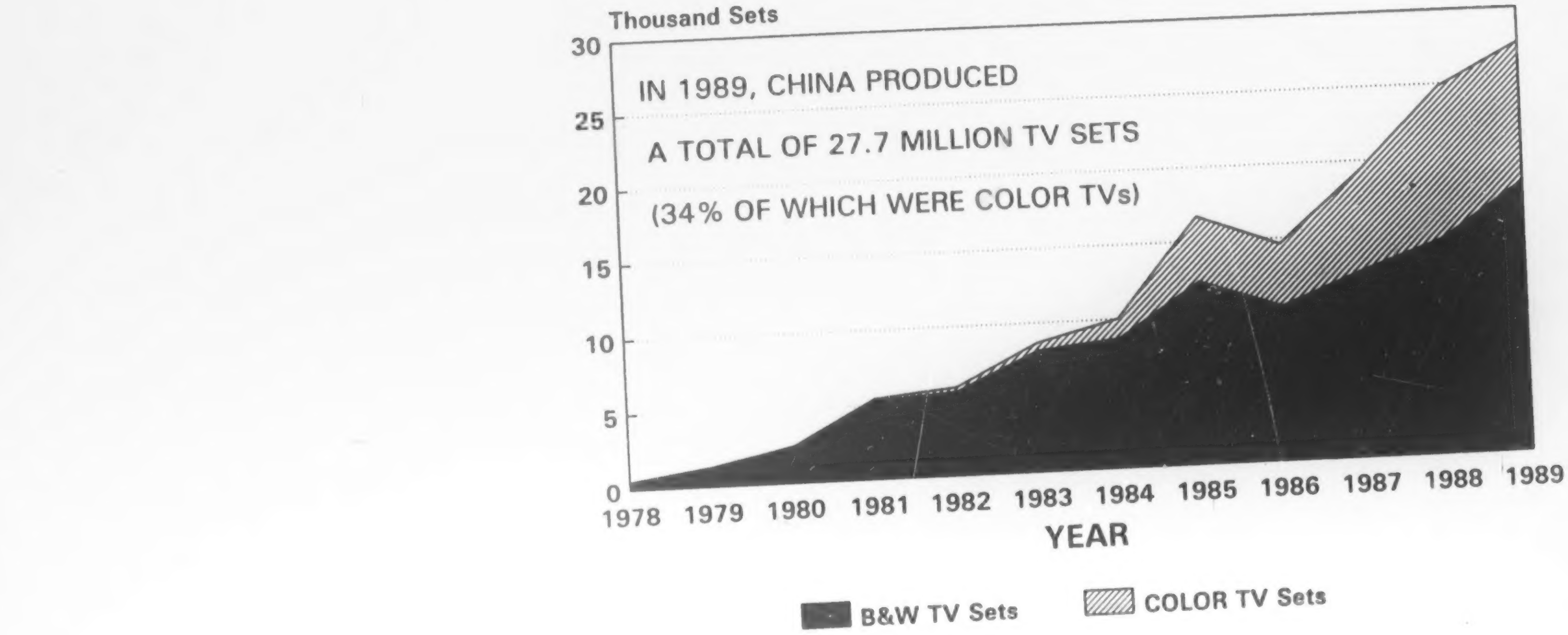
[67] "Exchange Woes Put TV Producers in Bind," *China Daily*, February 15, 1989, p.4.

[68] "Home Target for Tube Makers," *China Daily* (Business Weekly), April 24, 1989, p.2.

[69] "Current Problems and Demand Forecast of China's Semiconductor Market," *Dianzi Shichang* (Electronics Market), June 22, 1989, p.2.

Figure 2

TV SET PRODUCTION IN CHINA, 1978-89



UNIT: 1,000 SETS

TABLE 6

China's Leading Television Manufacturers, 1989

Unit: 1000s of sets

FACTORY	OUTPUT	COLOR TV	TOTAL SALES	SALES % /OUTPUT
WUXI TV FACTORY	1,187	235	1,117	94.2%
SHANGHAI #18	1,150	142	1,101	95.7%
SHANGHAI #4	1,148	101	1,121	97.7%
NANJING RADIO	1,071	237	944	88.1%
SUZHOU TV	1,018	204	1,005	98.7%
SHANGHAI #1	886	38	868	98.0%
HANGZHOU TV	788	131	628	79.7%
TIANJIN BROADCAST EQUIP	658	381	535	81.3%
CHANGHONG	651	448	412	63.4%
DALIAN TV	601	126	463	77.1%
TIANJIN TV	545	192	394	72.2%

Source: *Zhongguo Dianzi Bao*, April 1990.

regulate the chip circuits that can be employed in the production of color TV sets; starting in early 1990, for example, certain chip sets used by Hitachi and Sony declared ineligible as far as the State production of optimized chip circuits.[70] In the case of the former, a strategy was put in place to significantly expand domestic production capacity.

Starting in 1981 with the opening of the Shaanxi Color TV Tube Factory in Xianyang, the central government has encouraged the development of four (including the Xianyang facility) color TV tube bases, with Beijing, Nanjing, and Shanghai being the other three sites. The Beijing project involves a U.S. $152 million joint venture with a capacity of 1.8 million tubes between Japan's Matsushita, the Beijing Electronic Tube Factory, and the Beijing branch of the China Electronics Import and Export Corporation.[71] The Shanghai project is a U.S. $109 million joint venture with a production capacity of 1.0 million tubes between the Hong Kong Novel Technology

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[70] According to officials in the ministry, the TDA double-chip circuit has been determined to be the best optimized circuit for use in China. Those manufacturers who do not use the approved chips will not receive preferential treatment in pricing and sourcing from the central authorities. See *China Informatics*, April 30, 1990, p.121.

[71] "Kinescope Firm Highlights China's Investment Climate," *Beijing Review*, January 15–21, 1990, pp.27–29.

TABLE 7

SELECTED EXAMPLES OF PRC COLOR TV PRODUCTION LINE IMPORTS[a]

Unit: Single Lines

COUNTRY	TOTAL # LINES	COMPANY	# OF LINES
JAPAN	50		
		MATSUSHITA	8
		HITACHI	7
		JVC	13
		TOSHIBA	6
		SANYO	4
		NEC	3
		SHARP	5
		OTHER	4
WESTERN EUROPE	2		
		PHILIPS	1
		GRUNDIG	1
HONG KONG	18		
		LU-DI	6
		KANG-LI	5
		OTHER	7

Source: Ministry of Machine-Building and Electronics Industry, Beijing, 1989.

[a] The number of production lines noted in this table does not account for the total of 113 lines imported in 1981-88. Several lines apparently came from non-designated sources, including knocked-down lines from Taiwan and South Korea as well as several discontinued lines from Hong Kong.

Development Company and the Shanghai Vacuum Electronic Parts Company; the picture tube technology comes from the Toshiba Corporation of Japan. The third project in Nanjing is a joint venture with a capacity of 1.6 million tubes named the Huafei Color TV Tube Factory involving technology from Philips of Holland and the Huadong Electron Tube Factory.[72] The Xianyang Factory in Shaanxi has a capacity of 960,000 color tubes, though last year it produced 1.06 million tubes. It relies on technology from Hitachi, Toshiba and the U.S. A fifth project appears underway in Shenzhen involving technology from the Hitachi Corporation of Japan. Four related projects to produce the glass bulbs for color TV tubes have also been inaugurated: one in Shijiazhuang, one in Anyang in Henan with Corning Technology, one in Shenzhen with Corning Technology as well, and the last one in Chengdu involving technology transfer from Asahi Glass of Japan.

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[72] "Philips Signs More Electronics Agreements," *China Daily*, November 11, 1987, p.2.

The major question confronting China, however, as it moves ahead with a projected plan to manufacture approximately 10–13 million color TV tubes a year is whether or not it is economically feasible to become basically self-reliant in this area.[73] Because of China's continued need to import the raw materials to make the bulbs and tubes, preliminary estimates are that it would cost China U.S. $150 million in foreign exchange to sustain 10 million tubes of output.[74] China is also still dependent on foreign companies for advanced designs used in state-of-the-art color televisions.

Moreover, there are major questions about the ability of the Chinese market to absorb color TV sets at the pace required to keep the industry financially viable. Many of the sets being produced are not state-of-the-art; in early 1990, for example, there were indications that over U.S. $40 million worth of "ordinary" color TV sets were being stockpiled.[75] The Chinese government ordered production of color TV sets reduced by 30% in 1990 in response to a sluggish domestic. This is a major step in view of the fact that the production value of color TVs was U.S. $3.3 billion in 1989, accounting for 24.4% of the total value of electronics production.[76]

Finally, there is the question of high-definition television. Ultimately, China, which already is the largest producer of black and white television sets in the world, may also become the largest manufacturer of color TVs, especially if labor and material costs in Taiwan, South Korea, and Hong Kong continue to climb. In 1989, total TV exports reached 3.9 million sets (1.8 million were color TVs), an increase of 49% over 1988. If HDTV takes off, however, China could be stuck with an expensive infrastructure designed to manufacture TVs primarily for the Third World and perhaps the former socialist countries in Eastern Europe.

VI. Prospects and Conclusions

The expanded use of new technology in Chinese industry and agriculture is essential if the PRC is to achieve its long term goal of closing the gap with the Western industrialized nations. In some cases, Chinese leaders realize that the most practical answer is to make better use of existing equipment through improvements in plant layout and more efficient use of energy and raw materials. In other cases, there is no choice but replacement—whether through imports or from domestic suppliers. Nonetheless, the central questions remain the same. How does China choose which enterprises should be targeted for access to scarce funds? At what level should decisions be made for implementing technological upgrading? What criteria should be used in the selection of appropriate technologies, equipment, suppliers? Unless these questions are answered satisfactorily and systematically, and in a manner consistent with the central thrust of overall economic policy, the result will be a series of unfulfilled expectations as far as the investment in technology import is concerned.

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[73] "TV Industry Approaches Self-Sufficiency," *China Daily*, October 1, 1990, p.3.

[74] "Make Less Color TV Tubes—Think Tank," *China Daily*, July 31, 1989, p.2.

[75] "Color TV Sales Rise in April," *China Daily*, May 2, 1990, p.3.

[76] See *China Electronics Industry Yearbook*, 1990 (Beijing, 1990). See also "TV Exports Rose to 1.89m by May," *China Daily*, June 29, 1990, p.2.

Any assessment of China's performance with respect to foreign technology acquisition and assimilation must remain preliminary in view of the fact that many projects have yet to be completed, and it is hard to measure just to what extent the Chinese scientific and engineering community has truly advanced its indigenous technological capabilities over the last several years. Of course, there have been a number of very positive developments, including the substantial improvements in manufacturing techniques and processes, expanded training of individuals, and a more sophisticated understanding of the challenges associated with effective use of foreign technology. Legislation covering the transfer of technology has also been enacted, including a patent law and a copyright law. Major gains have also occurred in the science and technology system, with some fairly dramatic improvements taking place in research dealing with automation, new materials, microelectronics, and biotechnology. These gains promise to have positive spillovers into the economy as a whole, and for technology import activities in particular, as a result of the concerted effort being made by both the SSTC, the Chinese Academy of Sciences, and the SPC to ensure that S&T and the economy do not remain as disjointed as in the past. Given the degree to which production of various critical raw materials, components, etc. has increased, the overall contribution of foreign technology must be acknowledged. In other words, collaboration with foreign technology suppliers has proven to be of pivotal value to China.

Yet, the fact remains that there are significant problems in the Chinese system that detract from the country's ability to fully realize the potential benefits in both economic and technological terms. In many respects, China is facing a two-fold problem. On the one hand, the Chinese are coming up against the constraints within their own system. Problems of uncertainty associated with the economic reforms, e.g. incomplete price reform, and the tensions between the central and local governments for control and decision-making autonomy, combined with a host of factors associated with low labor productivity, poor quality control, and ineffective management, make it difficult to create a workable system for coordinating and monitoring technology import work. The Chinese continue to use the term "*wujihuaxing*" meaning "no planning" to describe the fact that a great deal of technology import activity occurs in a blind fashion, causing serious waste of time and resources. In this regard, the effort by Beijing to assert greater control over the foreign trade sector in the aftermath of the 1988–89 economic crisis may not have been such an irrational thing to do, particularly given the fact that local spending had gotten nearly out of control. Some appreciable tightening up by the central government in the field of technology import work may not only yield benefits to the domestic economy by providing more gudiance and direction, but also may prove attractive to foreign firms that have been bewildered by the pulling and tugging from various quarters within the Chinese bureaucracy. Greater central government involvement in the form of high level project sponsorship could also mean better guarantees as far as the availability of production inputs are concerned, power availability, etc.

Still, the various efforts by the Chinese to attract foreign knowhow and expertise that could help overcome many of the country's prevailing problems have been slow to materialize because of continuing questions about China's investment climate, its actual commitment to protect proprietary information, and a series of related issues. In reality, there are many other attractive investment alternatives to China where the local skill levels, managerial capabilities, and investment environment are all less problematic. In a world in which themes such as globalization and regionalization are occupying the attention of corporate executives and economic policymakers, Chinese leaders must begin to find ways to project an image that reflects a more systematic approach to working with foreign companies. Otherwise, China's ability to gain access to desired foreign technology and leverage its technological capabilities in the international marketplace may be extremely limited. This may be a rather disconcerting thought to current Chinese leaders as they seek to identify what role China should play—in both political and economic terms—in the world of high technology in the next decade and beyond.

CHINA'S SPACE PROGRAM

By Marcia S. Smith *

CONTENTS

Page

Summary 599

I. Launch Vehicles and Launch Sites 600

II. Chinese Satellites 600

III. Commercial Space Activities 601

A. Materials Processing Flight Opportunities 601

B. Launch Vehicle Services 601

1. Asiasat and AUSSAT: The U.S./China Agreement on Launch Services 602

2. Controversy over the Arabsat Contract 603

IV. Remote Sensing and Communications Satellites 605

V. International Cooperation 605

VI. Future 606

APPENDIXES

1. Table of Chinese Satellite Launches 608

2. Chinese Launch Vehicles 610

SUMMARY

China launched its first satellite in 1970, and by the end of August, 1990, had successfully completed 26 launches [1], placing 29 satellites into orbit (see Appendix 1). China is currently focussing its attention on the practical applications of space technologies, such as communications and weather satellites, and on the potential of commercial space activities.

China's entry into the international commercial launch services market has prompted considerable debate in the United States over whether U.S.-made satellites should be launched on Chinese vehicles. Asiasat-1, built by Hughes Aircraft Co., was launched by a Chinese Long March 3 vehicle in April 1990, and export licenses have been granted for two more Hughes-built communications satellites (AUSSAT 1 and 2) for launch in 1991 and 1992. The issue continues to be very controversial, focussing on whether the Chinese are charging unfairly low prices for their services, and therefore undermining U.S. (and European) companies offering similar services. Technology transfer and the political situation in China are also concerns. Another commercial activity is launching experi-

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[1] The Chinese have acknowledged an additional three launch failures, although there may have been other, unacknowledged failures during the 1970s and early 1980s when the Chinese were less open about their space program.

ments for foreign companies on Chinese satellites. In 1987 and 1988, China launched experiments for France's Matra, and West Germany's Intospace consortium.

China has expressed interest in a broad range of future space activities, including building space shuttles and space stations. Such programs probably will be prohibitively expensive for many years to come, however.

I. LAUNCH VEHICLES AND LAUNCH SITES

China has developed a family of launch vehicles called Long March, and several versions of it are in use today. The Long March 2C is used for satellites destined for low Earth orbits, and is launched from the original Chinese launch site at Shuang Chengtzu (41.2 ° N, 100.1° E), near Jiuquan in the Gobi desert. The Long March 3 and Long March 2E vehicles are used to place satellites in geostationary orbit [2] from China's second launch site, inaugurated in 1984, at Xichang (28° N, 103° E) in southeastern China. The Long March 4 is launched from the newest Chinese launch site, Taiyuan (38° N, 112° E), south of Beijing, for launches into polar orbits.[3] Taiyuan and the Long March 4 have been used only once so far (in 1988) for China's first weather satellite; another weather satellite launch is scheduled for 1990. (The launch vehicles and their capabilities are listed in Appendix 2.)

All of the Long March vehicles are available for commercial launches, although the most interest is in the Long March 2E and Long March 3 since most commercial satellites are for communications and need to be placed in geostationary orbit.

II. CHINESE SATELLITES

As detailed in Appendix 1, several of the satellites launched by the Chinese have been recovered back on Earth. The recovery of a satellite usually means that its payload is either a scientific experiment that requires analysis by researchers on the ground, or, more often, film for recording images of the Earth for military reconnaissance or civilian remote sensing of the land and oceans. As discussed below, two of the recovered satellites (in 1987 and 1988) carried materials processing experiments for French and German firms. The Chinese have stated that another (in 1987) was for scientific purposes. The remaining recovered satellites also could have been for scientific purposes, but are thought by Western analysts more likely to have been related to developing a military photographic reconnaissance capability. The Chinese have never admitted to developing such a capability, referring only to "reconnaissance surveys of natural resources" and "photographic surveys" using this type of satellite.[4] Additional Chinese satellites that were not recovered but whose missions have never been announced are thought to be related to the development of other types of reconnaissance (electronic intelligence, for example).

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[2] Geostationary orbit exists 35,800 kilometers over the equator. Satellites placed there maintain a fixed position relative to a point on Earth, and therefore the orbit is very useful for communications satellites. Some weather satellites and certain types of reconnaissance satellites are also placed in this orbit.

[3] A polar orbit circles the Earth's poles and a satellite placed there will pass over every point on the globe. Polar orbits are used primarily for weather, science, and reconnaissance satellites.

[4] *Zhongguo Xinwen She*, 1335 GMT, 31 Jul 90. In Foreign Broadcasting Information Service (FBIS) China Daily Report, 8 Aug 90, p. 31.

One other Chinese launch, in 1981, was definitely for scientific purposes: three satellites were placed into orbit simultaneously for space physics experiments. China has launched one weather satellite (which failed shortly after launch), and another is planned for launch in 1990. In recent years, an increasing number of Chinese satellites are for domestic communications, and as discussed below, the Asiasat-1 spacecraft (partially owned by China) is for regional communications. China also has launched an experimental satellite for Pakistan (Badr-1).

III. COMMERCIAL SPACE ACTIVITIES

The main areas of commercial interest in the Chinese space program are selling launch vehicle services to place satellites in orbit for commercial customers, or carrying experiments for foreign companies on Chinese satellites.

A. MATERIALS PROCESSING FLIGHT OPPORTUNITIES

Only China and the Soviet Union currently offer flights of materials processing in space (MPS) experiments on free-flying satellites.[5] These commercial activities involve purchasing space aboard a Chinese satellite, rather than buying a launch vehicle service.

In 1987, the French company Matra paid for the launch of a MPS experiment on a Chinese satellite launched by a Long March 2. The West German consortium Intospace flew experiments on a Long March 2 in 1988. The Chinese reportedly charge about $20 million for use of the entire Long March 2 spacecraft, and between $30,000 and $50,000 per kilogram for a partial payload.[6] This is consistent with the fee Intospace was charged: about $1 million for a 20-kg experiment, or $50,000/kg.[7]

B. LAUNCH VEHICLE SERVICES

China offers launch vehicle services through the China Great Wall Industry Corp., and launch insurance through the Peoples Insurance Co. The Chinese have made a concerted effort since 1985 to market launch vehicle services internationally; the main competitors are three U.S. companies (McDonnell Douglas, General Dynamics, and Martin Marietta) and Europe's Arianespace.

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[5] MPS experiments include a number of fields of research into producing substances in the low gravity environment of space that may be superior to similar substances produced on Earth. The research includes growing crystals (like gallium arsenide, that could be used in computer chips, or protein crystals for use in pharmaceuticals), or electrophoresis in which an electrical current is passed through a liquid to produce pure vaccines. MPS experiments can be conducted using airplanes or sounding rockets (which can provide seconds or minutes of microgravity), and the U.S. space shuttle or the Soviet space station Mir. Flights on free-flying satellites are often preferable, however, because the experiments are exposed to microgravity conditions for a longer time versus sounding rockets or airplanes, and do not have astronauts nearby who may accidentally interfere with their operation by creating vibrations. Flights on free-flying spacecraft also are probably less expensive than using the space shuttle or Mir.

[6] "Chinese Bid for Reentry Business", *Aerospace America*, Mar. 1988, p. 19.

[7] See: Covault, Craig. "Chinese Prepare Long March Booster for Launch with German Payload." *Aviation Week and Space Technology*, July 25, 1988, p. 26.

To date, the Chinese have signed four contracts for launches: Asiasat-1, two AUSSATs, and Arabsat 1-C (these agreements are discussed in more detail below). A commercial agreement to launch a Swedish satellite apparently has fallen through, since it has been announced that the satellite will now be launched on a U.S. vehicle.[8] The Chinese launched a Pakistani test satellite in 1990, but there is no indication that this was a commercial arrangement (this was the first launch of the Long March 2E, and its primary purpose was launching a simulated AUSSAT satellite to demonstrate the rocket's capability).

1. Asiasat and AUSSAT: the U.S.-China Agreement on Launch Services.

China's first launch contract was signed with AsiaSat Co., which is owned by three entities, each having a one-third share: Cable and Wireless PLC of London, Hutchinson Telecommunications Ltd. of Hong Kong, and CITIC Technology Inc., a subsidiary of the China International Trust and Investment Corp.(CITIC). Cable and Wireless has overall management responsibility for Asiasat; the company is based in Hong Kong. The Asiasat-1 satellite (which is the refurbished Westar 6 satellite that was recovered by a space shuttle crew in 1984 after it failed to achieve the proper orbit) was purchased by AsiaSat Co. At about the same time that China and AsiaSat signed their launch agreement, China completed a contract with the Australian government for the launch of AUSSAT 1 and AUSSAT 2 in 1991 and 1992.

Virtually all communications satellites in the free world are either built by U.S. companies, or U.S. companies serve as major subcontractors to European or Canadian firms. Thus, export licenses are required from the United States, and approval must be sought from the Coordinating Committee on Multilateral Export Controls (CoCom).[9] All three of these satellites—Asiasat 1, AUSSAT 1, and AUSSAT 2—are built by Hughes Aircraft Inc., an American company.

Export license requests were made to the U.S. State Department in July 1988 to send the three U.S.-built satellites to China for launch. Two major issues arose at that time which continue to generate controversy today. The first is technology transfer—whether China might obtain U.S. technology by having access to U.S. communications satellites. The second is whether the Chinese will abide by fair trade practices in pricing their launch services. In early September 1988, during a visit to China, then-Secretary of Defense Carlucci expressed no reservations about technology transfer from launching U.S.-built satellites on Chinese launchers.[10] In fact, he reportedly felt that there would be expanded technology transfer with China in the future. However, the following specific procedures to protect against technology transfer were agreed upon: 1) all customs inspections of the satellites would be waived; 2) no Chinese technician would touch or have access to the satellites;

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[8] "OSC Signs Launch Agreement with Swedish Firm." *Defense Daily*, Dec. 20, 1989, p. 431.

[9] CoCom members are all the NATO countries except Iceland, plus Japan.

[10] *Defense Daily*, Sept. 8, 1988, p. 1.

and 3) in the case of an accident, all satellite debris would be returned to the United States.

For the Asiasat and AUSSAT contracts, the Chinese offered an "introductory" price of about $30 million each, far below rates for comparable launch services by Western companies.[11] The Chinese contend that the price was "promotional," intended to build a customer base. The term "promotional" was never clearly defined.

Consultations between the two nations continued, and on December 17, 1988, the U.S. State Department announced that China had agreed to the following conditions:

- That it would sell no more than a total of nine commercial satellite launches to anyone through 1994;
- That it would offer its launch services, including insurance and reflight guarantees, on prices, terms, and conditions on a par with those offered by companies in market economies.

The phrase "on a par" was never explicitly defined in the negotiations or the agreements.[12]

All these conditions were met by January 1989. Approval for the export of the AUSSAT and Asiasat satellites was granted by CoCom in March 1989. Following the Tiananmen Square demonstrations in June, however, the Bush Administration suspended all export licenses for items on the Munitions Control List, including the three satellites.

Congress subsequently passed legislation (P.L. 101-192, section 610) prohibiting the export of the satellites unless conditions improved in China, or unless the President certified to Congress that it was in the national interest of the United States to reinstate the licenses. In December 1989, the President made that certification to Congress. Asiasat-1 was exported to China and launched in April 1990.

The AUSSAT satellites are still under construction in California. On June 10, 1990, the House passed a bill (H.R. 4643, the Export Facilitation Act) that includes a provision prohibiting export of U.S.-made satellites to China for launch. Since the AUSSAT satellites have not left the country, the language, if enacted, apparently would apply to them, although the sponsor of the language, Representative Solomon, stated that he did not intend to affect the existing export licenses.[13]

2. Controversy Over the Arabsat Contract

In March 1990, the European launch services company Arianespace, which launches the Ariane rocket, charged that China was violating its agreement with the United States by selling launch services to the Arabsat Consortium for below fair market prices. The issue developed in connection with the planned launch of

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[11] These launch cost figures were provided by AsiaSat Co. and AUSSAT officials during congressional testimony on the Reagan Administration's decision to license the export of satellites for launch on the Chinese Long March launch vehicle. One U.S. ELV industry official testified that a fair price for a equivalent launch on a Delta rocket would be $50 million. See: U.S. Congress. House Committee on Science, Space and Technology. "The Administration's Decision to License the Chinese Long March Launch Vehicle." Hearings. 100th Cong., 2d Sess. Sept. 23 and 27, 1988. Washington, U.S. Govt. Print. Off., 1989. pp. 91, 110, 288.

[12] Telephone conversation with State Department official, June 1, 1989.

[13] *Congressional Record*, June 6, 1990, p. H 3302.

Arabsat 1-C on a Long March vehicle for a reported price of $25 million, approximately half of what would be charged by Arianespace or a U.S. company.[14] Although the satellite was built by Aerospatiale (a French company), Ford Aerospace was a major subcontractor and approximately 60 percent of the components are American-made.[15] Thus, Arianespace appealed to the French and U.S. governments to deny an export license for the satellite.

This issue reportedly was raised during already scheduled trade talks between the U.S. and China in July 1990, but the outcome is unclear. The head of the U.S. delegation, Donald Phillips, from the Office of the U.S. Trade Representative, said that the Chinese "presented information and their own rationale" for their actions, and that the issue is "still under review." [16]

Chinese space officials assert that they are abiding by the agreement, and that this is primarily a matter of China being able to offer lower prices because it has lower costs. Chen Shouchun, vice president of China Great Wall Industry Corp., points out that it took only 18 months to develop the Long March 2E booster (the newest version), compared to the 3-4 years it would have taken in the West.[17] He also noted that there have been more failures in the Ariane launch vehicle program than with the Long March, and Arianespace's customers must bear those costs. The opinion that China may be able to charge lower prices even if it fairly takes into account all its costs may have some following in the United States. During the debate over the Asiasat and AUSSAT export licenses, an unnamed U.S. industry official estimated that even without promotional pricing, the cost of a launch by the Chinese would be 30 to 50 percent cheaper than a similar launch on a U.S. or European vehicle.[18]

Another Chinese official, Lin Huabao, deputy chief of engineering at the Chinese Academy of Space Technology, feels that the entire U.S.-China agreement itself is unfair. "China is a sovereign country. There should not be any limits imposed by outside governments like this. For a sovereign nation, this is not a good thing." [19]

China's ultimate success in commercial space depends on several factors. For free-flying materials processing experiments, the Chinese have only one competitor (the Soviet Union), but it is not clear how large the market is for these types of experiments. For communications satellites, China can offer launches in the near term, a significant advantage since European and U.S. launch services companies are often booked up years in advance. Although low prices also might attract business, if the United States or other governments conclude that the prices do not follow fair market standards, they could respond by denying export licenses for the satellites, which would significantly undermine China's prospects.

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[14] Lawler, Andrew. "U.S. to Confront China on Launch Sales." *Space News*, July 9-15, 1990, p. 1, 29.

[15] Lawler, Andrew. "U.S. Urged to Protest Arabsat Launch." *Space News*, Mar. 26-Apr. 1, 1990, p. 29.

[16] Quoted in: "Group Seeks Launch Satisfaction." *Space News*, July 30-Aug. 5, 1990, p. 2.

[17] Chen Shouchun, vice president of Great Wall Industry Corp., quoted in: Chen Gengtao. "Defending Chinese Launch Pricing." *Space News*, Aug. 20-26, 1990, p. 15.

[18] See *Defense Week*, Aug. 8, 1988. p. 3.

[19] Quoted in: de Selding, Peter. "Chinese: Launch Accord Unfair." *Space News*, Apr. 30-May 6 1990, p. 20.

A potential disadvantage is that the Long March vehicles do not have a long track record, making their reliability difficult to estimate. The perceived political stability or instability of the Chinese government may also influence potential customers.

IV. Remote Sensing and Communications Satellites

The Chinese are also involved in the areas of satellite remote sensing (including weather) and communication satellites.

The Chinese operate a remote sensing receiving station that acquires data from the U.S. Landsat remote sensing satellites.[20] The Chinese pay an annual lease fee of $600,000 to EOSAT, the private U.S. operator of the Landsat system, and in return are free to sell the data to anyone. In addition to their own sales, the Chinese have an agreement with EOSAT to market data for them in China.

In late 1988, China launched its first weather satellite, which apparently failed soon after launch. Another weather satellite is planned for launch in the fall of 1990. Both of these are polar orbit satellites; the Chinese state that they will also build geostationary weather satellites in the near future.[21]

To date, the communications satellites built and launched by China have been relatively small and are used for domestic Chinese telecommunications. The Asiasat-1 satellite, however, is larger and provides communications not only for China, but for neighboring countries on a commercial basis. Since China is a one-third partner in AsiaSat Co., this will generate revenues for China. The Chinese are planning to develop a larger and more sophisticated communications satellite for its domestic use as well, and reportedly hope to enter into the market of selling satellites someday (in addition to launch services).[22]

V. International Cooperation

In addition to its commercial space activities, China has signed several agreements for international cooperation in space (which usually does not involve an exchange of funds). In 1984, China signed three agreements for cooperation in space technology with the Federal Republic of Germany, Italy, and France. More recently, China has formed a joint venture with Brazil, called the International Satellite Communication Ltd. (INSCOM), to sell communications satellite launching, tracking and networking services on the world market.[23] In 1988, the two countries announced plans to jointly build a remote sensing satellite for launch by China in 1992 (and perhaps a second in 1994), but the current status of that project is unclear.

Also in 1988, the Chinese signed an agreement with Australia for joint technical and commercial ventures (including the AUSSAT launches, cooperation in remote sensing and satellite ground support). The agreement provides for creation of a joint space commerce and technology working group to coordinate activities. The launch of a Pakistani satellite on a Chinese launch vehicle in 1990 heralded cooperation between those two countries; there seems to have been no prior announcement of this joint space activity and it is unclear whether there will be additional cooperative projects between China and Pakistan.

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[20] Landsat data are used for many purposes including crop forecasting, land use planning, mineral exploration, and pollution monitoring.

[21] The United States is the only other country that has weather satellites in both geostationary and polar orbits.

[22] Barton, Charles. "Chinese Plan Trio of Satellites to Broaden Marketing Prowess." *Space News*, Aug. 6–12, 1990, p. 4, 39.

[23] Kolcum, Edward. "Brazil, China Form Space Launch Venture." *Aviation Week and Space Technology*, May 29, 1989, p. 35.

There is no U.S./China agreement for space cooperation, although discussions have been held between the two countries for several years. The Chinese have selected two student experiments to fly on the U.S. space shuttle, but they are being flown as part of the Get Away Special (GAS) program where anyone can purchase a small container (called a GAS-Can) for experiments that require no interaction with the crew or use of shuttle systems (like electricity). An individual working at the Jet Propulsion Laboratory [24] purchased the GAS-Can for the Chinese, so the flight involves no cooperation on a government-to-government or agency-to-agency level. The Chinese experiments are scheduled for the STS–42 mission (currently scheduled for launch on April 1991). A second Chinese GAS-Can flight is being planned, which will involve one experiment from China and one from Hong Kong.

VI. FUTURE

The Chinese talk boldly about future space plans such as building space stations, but also have nearer term objectives of building larger and more sophisticated communications and weather satellites. Any assertions by the Chinese about future space plans must be viewed with caution, however, since they have changed quite abruptly in the past. During 1979 and 1980, the Chinese proclaimed great expectations for utilizing space, and reportedly even had astronauts in training.[25] In late 1980 and early 1981, however, the Chinese retreated from their expansive plans because of a reassessment of the Chinese economic situation, and announced that their human spaceflight program had been postponed for at least the remainder of the decade.

In the mid-1980s, prospects for building a Chinese space station and space shuttle were raised by Chinese space program officials, who then quickly pointed out that approval for such projects was far from certain.[26] A 1988 Chinese report did assert that astronauts were being trained, but there were no specifics about what missions would be flown.[27] While some reports suggest that the Chinese might fly astronauts on a Chinese spacecraft launched by a Long March rocket,[28] it may be that these astronauts are being trained for prospective flights with either the United States or Soviet Union. The Chinese have shown interest for years in flying an astronaut on the U.S. space shuttle, and in June 1990, the possibility of a Chinese astronaut visiting a Soviet space station [29] was raised during a visit to the Soviet Union by Lt. Gen. Liu Huaqing, vice chairman of China's Central Military Commission. The discussions do not appear to have been very specific, however.[30]

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[24] JPL is a government-owned contractor-operated facility in California that is responsible for most NASA planetary missions. It is operated for NASA by the California Institute of Technology.

[25] Early Chinese interest in placing humans in space was indicated by the 1967 suborbital flight of a puppy, Xiao Bao (Little Leopard), who was successfully recovered (in both the United States and the Soviet Union, human flights were preceded by animals). Also, in 1968 the Chinese established a Space Flight Medical Program Research Center which included simulators for human spaceflight.

[26] *South China Morning Post*, 6 Feb 87, p. 5. In FBIS China Daily Report, 11 Feb 88, p. 2.

[27] *Zhongguo Tongxun She*, 1158 GMT, 15 Dec 88. In FBIS China Daily Report, 28 Dec 88, p. 31.

[28] *South China Morning Post*, op. cit. See also: Covault, Craig. "China Developing Technology for Future Manned Space Flight." *Aviation Week & Space Technology*, June 29, 1987, p. 22.

For the present, the Chinese are focussing on practical applications of space such as communications and weather satellites, and on commercial space opportunities. With or without commercial customers, China seems committed to its space program. The investment in three launch sites and a range of launch vehicle capabilities would not be easily forsaken whatever the country's economic or political future. The only real question is how vigorously they will pursue space activities in the years ahead.

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[29] The Soviets have launched representatives of many nations to their space stations since 1978. Today, these flights are made on a commercial (rather than cooperative) basis, and cost approximately $10 million. Austrian, Japanese and British astronauts are now in training in the Soviet Union.

[30] Moscow International Service in Mandarin, 0200 GMT, 6 Jun 90. In FBIS Soviet Union Daily Report, 12 June 90, p. 14.

APPENDIX 1

CHINESE SPACE LAUNCHES THROUGH AUGUST 31, 1990[1]

Name	Launch Date	Launch Site[2]	Comments
China 1	04/24/70	S	Engineering test. "East is Red" song played until 05/20/70.
China 2	03/03/71	S	Housekeeping test and possible science.
China 3	07/26/75	S	Science? Reconnaissance? Not recovered.
China 4	11/26/75	S	Possible reconnaissance test. Recovered.
China 5	12/16/75	S	Like China 3.
China 6	08/30/76	S	Possible electronics intelligence gathering test and/or science. Not recovered.
China 7	12/07/76	S	Possible reconnaissance test. Recovered.
China 8	01/26/78	S	Possible reconnaissance test. Recovered.
China 9-11	09/19/81	S	Triple scientific payload for space physics experiments.
China 12	09/09/82	S	Possible reconnaissance test. Recovered.
China 13	08/19/83	S	Possible reconnaissance test. Recovered.
China 14	01/29/84	X	First Long March 3 launch; upper stage failed.
China 15	04/08/84	X	First Chinese geostationary communications satellite.
China 16	09/12/84	S	Possible reconnaissance. Recovered.
China 17	10/20/85	S	Possible reconnaissance. Recovered.
China 18	02/01/86	X	Communications.

Name	Launch Date	Launch Site[2]	Comments
China 19	10/06/86	S	Possible reconnaissance. Recovered.
China 20	08/05/87	S	Materials processing experiment for a French company.
China 21	09/09/87	S	Science. Recovered.
China 22	03/07/88	X	Communications.
China 23	08/05/88	S	Materials processing for German company. Recovered.
China 24	09/06/88	T	Weather.
China 25	12/22/88	X	Communications.
China 26	02/04/90	X	Communications.
ASIASAT 1	04/07/90	X	Communications (commercial launch).
BADR 1	07/16/90	X	Pakistani test satellite plus engineering test satellite.

1.Prepared by CRS based on data from Chinese news bulletins; *World-Wide Space Activities* (House Science and Technology Committee, 1977); and Clark, P. S. The Chinese Space Programme. *Journal of the British Interplanetary Society*, v. 37, 1984. p. 195-206.

2.S = Shuang Cheng-tzu. X = Xichang. T = Taiyuan. Launch dates are in Greenwich Mean Time.

APPENDIX 2

CHINESE LAUNCH VEHICLES

Launch Vehicle	Launch Site	Kilograms to Low Earth Orbit	Kilograms to Geostationary Transfer Orbit[1]	Price ($ millions)
Long March 2C	Shuang Cheng-tzu	2,500	-------	20
Long March 2E	Xichang	8,800	2,500-4,000	25-30
Long March 3	Xichang	-------	1,400	25-30
Long March 4	Taiyuan	2,500 (polar)	-------	?

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1. Geostationary transfer orbit (GTO) is an elliptical intermediate orbit into which a satellite is placed enroute to geostationary orbit (GEO). A satellite in GEO will maintain a fixed position relative to a point on Earth, and therefore is very useful for communications satellites. Some weather and reconnaissance satellites are also placed in GEO.

THE EFFECTS OF TIANANMEN ON CHINA'S INTERNATIONAL SCIENTIFIC AND EDUCATIONAL COOPERATION

By Mary Brown Bullock *

CONTENTS

	Page
Summary	611
I. Pre-Tiananmen: The Scope of China's Scientific and Educational Cooperation	612
II. Post-Tiananmen Intellectual Relations	614
The United States	615
The United Kingdom	618
France	619
The Federal Republic of Germany	621
Japan	623
III. Renormalization? The Consequences of Tiananmen	626

SUMMARY

The Tiananmen massacre, China's ideological repression, and subsequent Western sanctions have shaken, but not destroyed, the foundation of China's international scientific and educational cooperation. China's extensive network of formal agreements and personal *guanxi* have weathered a sea-change in international policies and public opinion. Notwithstanding a marked reduction in foreign participation, the institutional structure of China's intellectual cooperation remains in place and is beginning to return to normal. China's educational door remains open, and the numbers of scholars and students studying abroad have not yet diminished. Brain drain has, however, become a more divisive reality.

Intellectual partners in the United States, Japan, Germany, the United Kingdom, and France reacted differently to Tiananmen, revealing the complexity of national and individual motives for engagement with China. Sino-Japanese relations have gained new salience, whereas European and American ties, more acutely influenced both by Tiananmen and the reforming Soviet Union and Eastern Europe, have lost momentum. The net result is not the collapse of intellectual cooperation, but a restrained resumption more overtly linked to encouraging future political reforms in China.

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I. PRE-TIANANMEN: THE SCOPE OF CHINA'S SCIENTIFIC AND EDUCATIONAL COOPERATION

In March 1978 Deng Xiaoping startled China and the world by ending China's self-imposed intellectual autarky:

> Independence does not mean shutting the door on the world nor does self-reliance mean blind opposition to everything foreign. Science and technology are a kind of wealth created in common by all mankind. Any nation or country must learn from the strong points of other nations and countries, from their advanced science and technology.[1]

He then went on to proscribe: "We must actively develop international academic exchanges and step up our friendly contacts with scientific circles of other countries." Making up for lost decades, China unleashed an unprecedented level of scientific and educational diplomacy. By the mid-1980s, it had established a truly impressive international scientific and educational presence.

Western scientists and educators responded enthusiastically. A French scientific administrator recalled: "The French felt emotionally close to China; we wanted to help." [2] A German diplomat, citing historical antecedents of the 1920s and 1930s, attributed his countrymen's enthusiasm to the "exotica of China: it was everything we were not." [3] Many Japanese referred to a post-World War II "guilt syndrome"—the hope for expiation. And Americans found deep satisfaction in the discovery that China was not "lost." To be sure, political and economic interests established the initial parameters of Sino-Western relations. But intellectual and cultural relations, driven by public enthusiasm, quickly became the cutting edge.

The nature and scope of intellectual cooperation between socialist China and the democratic West, including Japan, was surprising. The U.S.-China Scientific and Technical Agreement became the largest formal American scientific partnership with any country.[4] The China Program of the United Kingdom's Royal Society exceeded its other international commitments, and China ranked close to India in the commitments of the British Council.[5] Formal partnerships between German and Chinese universities dwarfed previous educational relationships, and China became the largest educational client of the German technical assistance agency, the Deutsche Gessellschaft Fur Technische Zusammenarbeit (GTZ).[6] In less than a decade, Chinese students and scholars in the United States increased to more than 40,000—the largest component of America's large international student population.[7] Likewise, by 1989, the total number of Chinese students and scholars in Japan had also grown to perhaps 40,000.[8]

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[1] Deng Xiaoping, "Speech at Opening Ceremony of National Science Conference," March 18, 1978, p. 4.

[2] Interview with Francoise Aubujeault, Centre National de la Recherche Scientifique, Paris, July 9, 1990.

[3] Interview with Albrecht von der Heyden, German Foreign Ministry, Bonn, July 16, 1990.

[4] The best summary of U.S.-China relations at the time of Tiananmen is in Kerry Dumbaugh and Larry Z. Nowels, "China-U.S. Cooperation: Military Sales, Government Programs, Multilateral Aid, and Private-Sector Activities." Congressional Research Service Report for Congress, June 9, 1989. For an overview of China's educational relations with the West see Ruth Hayhoe, *China's Universities and the Open Door* (M.E. Sharpe: Armonk, New York, 1989).

[5] Interviews with Peter Warren, The Royal Society, and Tim Callan, British Council, London, November 13, 1989.

[6] Interviews with von der Heyden, July 16, 1990; Munchend Imohl and Manfred Lindau, Deutsche Gesellschaft Fur Technische Zusammenarbeit, Eichborn, Germany, July 12, 1990.

For the Chinese government, this extensive international exposure has had ambiguous results. Frequent Chinese statistical litanies testify to satisfaction with the quantitative dimensions of intellectual diplomacy: scientific agreements with 108 countries, membership in 280 international organizations, and the initiation of 14,300 cooperative scientific projects in 1988 alone.[9] Yet, successive campaigns against spiritual pollution and bourgeois liberalism revealed persistent deep-seated hostility toward Western culture. Growing concern about "brain drain" began to cloud the educational "open door." Even science was not immune from suspicion, as far-reaching scientific reforms, patterned after Western institutional models, enhanced professional independence and reduced the influence of the Communist Party.[10]

Nonetheless, the political prestige and economic benefit which accrued to China were incalculable. "Scientific tourism" gave way to substantive, in-depth collaboration, which included high technology and applied technology, space science and railway engineering, solar energy and cancer epidemiology, engineering education and arid land development, laboratories and M.A. and Ph.D. degrees sponsored jointly by China and the West. It is difficult to name a discipline, a level of training, or a research field that did not experience Western expertise and collaboration during the 1980s. China's most sophisticated research and educational community, if not its infrastructure, was transformed and revitalized as a result of its incorporation into the world academic community.

What is historically unique about the 1980s is that the most advanced nations were drawn into close, and frequently reciprocal, collaboration with a poor, developing country. Intense interest in China's climate, environment, geology, flora, fauna, economy, and human diversity coupled with the growing sophistication of China's own intellectuals yielded a complex and highly professional network of Sino-Western collaboration. This was greatly augmented in the mid-1980s when most Western countries adopted technical assistance programs for China. It was this rich international network of human and material resources that was jeopardized by China's Tiananmen tragedy.

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[7] Leo Orleans, *Chinese Students in America* (National Academy Press: Washington, D.C., 1988).

[8] This includes more than 30,000 language students. *Statistics on Foreigners and Japanese Arriving and Leaving Japan in 1988* (Japan Immigration Association, Tokyo, 1989), p. 20. Student Outflows between China and Japan, May 21, 1987, Ministry of Science and Education, Tokyo, Japan.

[9] Wu Yikang, "Country Report or Workshop on Science and Technology Cooperation in Asia-Pacific Region," February 1990.

[10] Pierre Perrolle, "After Tiananmen: Science Relations with China," *Issues* (Winter 1989/90). Denis Simon and Merle Goldman, ed., *Science and Technology in Post-Mao China* (Harvard University Press: Cambridge, Mass., 1989).

II. POST-TIANANMEN INTELLECTUAL RELATIONS

The May Tiananmen student demonstrations symbolized the reforming China that the West applauded. The June violence and subsequent strident return to repressive ideological campaigns galvanized world opprobrium, at first nationally and then in concert. At the July Economic Summit, the Group of Seven curtailed economic assistance, commercial credits, and defense-related technology transfer. But Western governments did not abrogate education relations, and official sanctions generally excluded science. The European Economic Community's policy of "maintaining working level relations" in science and education, while postponing or cancelling new ventures, was in theory widely accepted.[11]

International sentiment was transferred from the student demonstrators in Beijing to the Chinese students abroad, many of whom demonstrated openly against Beijing. Public opinion came to equate these students with the Beijing martyrs. Protection of Chinese student visa status became a worldwide priority. Legislatures, the political entities most responsive to public opinion, in Canada, the United Kingdom, the Federal Republic of Germany, and the United States mandated protection. Canada was most generous: under a "humanitarian and compassionate review process" all Chinese students and scholars in Canada were offered permanent resident status. Concern for stranded students also led to emergency fiscal measures. France and Germany diverted previously allocated funds for programs in China to student relief. In addition, Germany also appropriated an extra 5 million DM for emergency student support. The United Kingdom created a special privately funded trust fund.[12] No federal fiscal action was taken in the United States, but the National Science Foundation dispensed $1.8 million in discretionary institution-wide funds to Chinese students, nearly twice its annual China program budget.[13] American universities and foundations also provided emergency support.

There was more initial consensus on sanctuary for Chinese students than for the nature of post-Tiananmen intellectual relations with China itself. In the year since Tiananmen, the international community has been torn between sustaining or cancelling programs with China. Those advocating continuity argued that the Chinese intellectual community would become more vulnerable and isolated if outside ties further diminished. Those advocating suspension hoped to influence, by protest and sanctions, more ameliorative Chinese government policies. Both positions have been embraced, sometimes simultaneously, within most Western countries. Brief examples from the United States, Japan, Germany, the United Kingdom, and France will be followed by a discussion of the longer-term consequences of Tiananmen upon China's international cooperation.

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[11] Dru Findlay, "The Impact of Recent Events in China on International Professional and Academic Exchanges and Related Development Activities," Ford Foundation report, August 31, 1989.

[12] Ibid. Carol Strevy, "Financial Status of Students/Scholars from the People's Republic of China on U.S. Campuses," Institute of International Education, February 1990. Interview with von der Heyden; interview with Patrick Bonneville, Ministry of Foreign Affairs, Paris, July 11, 1990.

[13] Interview with Pierre Perolle and Patricia Tsuchitani, National Science Foundation, May 1990.

THE UNITED STATES

Tiananmen intensified the politicization of cultural relations between the United States and China. A national debate over President George Bush's management of the China relationship was symbolized by the debacle over the Pelosi Bill (H.R. 2712), which provided five-year visa extensions for Chinese students. The differences between congressional and executive views of the Pelosi Bill highlighted continuing American uncertainty over the appropriate role of human rights in the overall bilateral relationship.[14] This debate was not limited to the political arena: the American scientific and educational community was deeply divided over the question of post-Tiananmen relations with China.[15] Of all nations, the American response to Tiananmen appeared most schizophrenic.

The harshest scientific reaction to Tiananmen came from American scientists, and yet the U.S. government continued, almost without interruption, some of its more important bilateral scientific programs. During the fall of 1989, a number of previously scheduled government scientific missions to China continued.[16] After only a short hiatus, negotiations on renewing the umbrella U.S.-China Scientific and Technical Agreement resumed with some progress toward resolving the longstanding intellectual property rights dispute. In early 1990, both the U.S. Department of Agriculture and the U.S. Geological Survey signed new, expanded cooperative agreements in agriculture and the earth sciences. Several months later, in May, 1990, the United States quietly once again extended (but did not reach final agreement on renewing) the umbrella S&T accord. This was publicly announced in China, but not the United States.[17]

The strongest reaction against China came from the two national scientific organizations most closely linked to the American university community—the National Science Foundation (a government agency), and the National Academy of Sciences (a nongovernmental organization). In protest of Tiananmen and the violation of human rights, both the National Academy of Sciences (NAS) and the National Science Foundation (NSF), the two most prestigious scientific organizations in the United States, suspended cooperation with China immediately after Tiananmen.[18] In contrast with other U.S. government agencies, NSF cancelled working group meetings, travel, and grants related to China except U.S.-based research projects. The NAS maintained communication with China, but cancelled the research visits of American scientists to China as well as bilateral group projects. These positions mirrored the sentiments of many, but not all, American scientists. Employing punitive sanctions as a means of protesting human rights violations has been a growing tenet of the American scientific community. NSF had limited contacts with the Soviet Union for many years due to human rights violations, and the NAS had followed suit when Andrei Sakharov was banished. Many drew analogies between Sakharov and Fang Lizhi's enforced protective custody in the American Embassy in Beijing. Yet, perhaps reflecting very sudden disillusionment with China, NAS China sanctions greatly exceeded those earlier leveled against the USSR during Sakharov's exile.

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[14] *New York Times* (December 15, 1989), p. A43.

[15] For the debate in the United States see *Science*, June 9, 1989, p.131-1132; August 4,1989, p. 461-462; *Chronicle of Higher Education* (August 16, 1989), B3-B4; *China Update: An Occasional Bulletin of the China Scholars Coordinating Committee, No. 1 (August 1989)*.

[16] U.S. Department of State, "Status of US/PRC Science and Technology Activities," Document 256784, Telegram, August 11, 1989.

[17] Interview with Wu Yikang, State Science and Technology Commission, Beijing, March 2-3, 1990; Interview with Jin Xiaoming, Chinese Embassy, Washington, D.C., May 11, 1990; *Xinhua*, May 18, 1990, in *FBIS*, May 21, p. 5.

[18] "NAS Suspends Collaboration with Chinese Institutions," NAS Media Advisory, June 7, 1989. Interview with Pierre Perrolle and Patricia Tsuchitani, National Science Foundation, May 10, 1990; interview with Erich Bloch, National Science Foundation, November 2, 1990.

In the social sciences, an almost reverse scenario took place. The official Fulbright Program was cancelled by the Chinese government in late summer 1989, the only such action taken by the Chinese side. On the other hand, nongovernmental relations were less affected, at least on the American side. Chinese social science institutions, especially the Chinese Academy of Social Sciences, remained under tight political scrutiny. But most individuals and institutes welcomed foreign contact if not formal programs. Key American nongovernmental organizations maintained ties with China. The Ford Foundation continued grants in the social sciences, staying open even during the summer of 1989. The Social Science Research Council and the American Council of Learned Societies sponsored American research in China during the fall of 1989. Other social science programs were sustained, including the United Board for Christian Higher Education in China, Yale-China, and the Lingnan Foundation. Somewhat surprisingly, several new ventures were initiated, including an American international relations program at Beijing University.

The views of American academia began to moderate during the winter and spring of 1990. This "softening" occurred worldwide, and can be attributed to four factors. The first was the continuing flow of bona-fide Chinese scholars abroad. Their participation at international conferences and in response to very specific invitations gave some assurance of continued professional freedom. Second was the successful informal diplomacy of a number of senior Chinese intellectuals. For example, Chinese Academy of Sciences President and Central Committee Member Zhou Guangzhao made an informal visit to the United States in January 1990, meeting with NAS President Frank Press and other influential American scientists. Third, although the Chinese government announced new worrisome restrictions on Chinese study abroad, the numbers remained high in 1989–1990, with many educational programs continuing on schedule.[19] Finally, American scientists and social scientists also began to revisit China during the first half of 1990. They returned with reports of politically discouraged Chinese intellectuals and renewed anti-intellectualism, but also of a scientifically engaged community more anxious than ever for international cooperation. These pleas for continued foreign contact from Chinese intellectuals were perhaps the most persuasive element in the resumption of foreign scholarly contacts with China.

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[19] For Chinese students coming to the U.S. see Strevy, *op. cit.* Also, Ken Yates, U.S. Embassy, Beijing to Mary Bullock, December 8, 1989.

Believing that a protest had been made and acknowledging that further isolation would probably hurt intellectuals more than it would speed political reform, the NAS and NSF began to resume programs in the spring and summer of 1990. Other institutions, which had reduced or postponed activities, also stepped up contacts, including convening bilateral conferences in Beijing. September 1990 brought the return of American Fulbright scholars to China and the reopening of the NAS/Committee on Scholarly Communication with the People's Republic of China Beijing office, both symbolizing the resumption of American intellectual ties to China.

Even as exchanges have resumed, the continuing presence of large numbers of Chinese students and scholars in American institutions of higher learning remains an important, and somewhat unpredictable, force.[20] In addition to the five-year visa extension, proposed changes in U.S.immigration laws, designed to attract foreigners in needed skills, will further ease permanent residency for many Chinese.[21] Employment opportunities (at least in the sciences and engineering), combined with a welcoming Chinese-American community, facilitates future U.S.-based careers. Concern and political sympathy for this new wave of potential immigrants remains strong, but this empathy does not now preclude resuming ties with individuals and institutions in the People's Republic of China.

This survival of American governmental and non-governmental institutional structures for scientific and educational relations with China does not necessarily mean the survival of American resources and enthusiasm for China. There are currently mixed signs. One recently conducted institutional survey reports that 57% of Chinese respondents experienced a slowdown in projects with the United States, while 60% of the North American institutions reported a similar slowdown.[22] On the other hand, a forthcoming survey from the Institute of International Education is expected to reveal that most reporting American universities (over 200) have resumed cooperation at nearly pre-Tiananmen levels.[23] NSF likewise reports that a year after Tiananmen, American scientists are requesting funds for China cooperation at fairly normal levels, with little concern for the political climate. In fact, despite the earlier NSF ban, FY90 grants for China research are nearly equal to those of FY88 and FY89, with most of the FY90 grants awarded in the summer of 1990.[24]

For Americans, the identification with China as a liberalizing country had been central to the expanding relationship. Intellectual relationships were not closely tied to economic interests, as in Europe, nor to developmental assistance programs as in both Europe and Japan. They were far more closely linked, implicitly if not explicitly, to the American historical mission of "changing China." In justifying a return to post-Tiananmen China, most reaffirm that mission.

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[20] Kerry Dumbaugh, "Chinese Student and Scholar Organizations in the United States," Congressional Research Service Report 90-558 F, Oct. 15, 1990.

[21] *New York Times*, August 27, 1990, p. A16.

[22] Hanmin Liu, "Issues in American-Chinese Scholarly Exchange Activities: A Survey." Paper prepared for International Health Forum: Building a common Ground, October 16-19, 1990.

[23] Information provided by Carol Strevy, IIE, September 1990.

[24] Interview, Patricia Tsuchitani, NSF, July 30, 1990.

THE UNITED KINGDOM

The United Kingdom's post-Tiananmen policies toward China have been the least volatile, emphasizing continuity. Mindful of ongoing negotiations over Hong Kong, the British have been anxious to preserve as many channels of Sino-British cooperation as possible. This is in keeping with the tenor of British policies since a concerted effort was made to strengthen Sino-British scientific and education cooperation in the mid-1980s.[25] Continuity has also been linked to hope for ongoing political reform and Sino-British trade:

> The Government's attitude however had been not to isolate China but to maintain people-to-people contact (both as a way of maintaining access for Western ideas in China and to encourage those who are working for reform) and to maintain commercial business links. [26]

The position of the Royal Society, which has led the way in defining the nature of the British scientific relationship with China, is illustrative. Normal relations were to be combined with protest and selective cancellation. Shortly after Tiananmen the Royal Society sent a cable to the Chinese Academy of Sciences expressing hope that relations would not be affected by Tiananmen, that exchanges would be continued. This was in keeping with long-standing Royal Society philosophy that: "The flow of ideas should continue as long as there are appropriate institutional links." In protest of Tiananmen atrocities, the Royal Society simultaneously elected to let lapse agreements with Chinese "government" organizations—the Ministry of Geology and the National Science Foundation of China—and dropped support for international conferences in China that it feared would become a propaganda front. The Chinese Academy of Sciences expressed appreciation for British empathy, noting that ties had been "very regular," but British scientists did not rush to take advantage of continuing institutional channels. During the post-Tiananmen year, there was nearly a 50% drop in British scientific travel to China under Royal Society auspices.[27]

Educational and social science relations have been fairly stable. The British Academy, representing the social sciences and humanities, was one of the few international organizations to maintain programs with China during the summer of 1989, albeit at a very reduced level. And the British Council, with its broad array of education and scientific programs, has maintained a consistent level of cooperation with China. This is not surprising given the heavy emphasis on applied science and engineering, fields of Chinese priority, and British commercial interests. Agreement is expected in the early fall on the renewal of the overall Sino-British Cultural Agreement, little changed from previous years. Although Britain has experienced few Chinese "brain drain" problems, in part because of the dearth of appropriate jobs, fewer Chinese Ph.D. candidates are expected in the future.[28]

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[25] For an overview of Sino-British cultural relations at the time of Tiananmen see British Council, "Narrative Review of the Year: China 1988/89," and The Royal Society, "Royal Society Relations with China, 1987," and the British Council, "Programme of Cultural, Educational and Scientific Exchanges between Britain and China, 1988–1990."

[26] The British Council, "Notes of the Seminar on British Academic Relations with China Held at the Royal Society, 25 September 1989," p. 1.

[27] Interview with Peter Warren, Royal Society, November 13, 1989; Phone interview with May Ling Thompson, Royal Society, September 20, 1990; Interview with Cheng Erjin, Chinese Academy of Sciences, March 6, 1990; Royal Society Press Releases, August 7,1989; July 2, 1990.

This continuity of core Sino-British scientific and cultural relations may partially explain Fang Lizhi's release to the United Kingdom. The Royal Society issued a scientific invitation in December 1989; it was formally accepted by Fang in January, and he was permitted to leave the American Embassy in July 1990. Fang's initial outspoken criticism of the Chinese government while in the United Kingdom (he has since left for the United States), is unlikely to affect the future course of Sino-British cooperation. On the other hand, declining British interest, muted criticism, concern about the future of Hong Kong, and shift of resources to Eastern Europe, are expected to dampen Sino-British relations.

FRANCE

Of all Western countries, Sino-French intellectual relations appear most damaged by the Tiananmen crisis. This is, however, only partially due to French reactions to Tiananmen. During the 1980s Sino-French economic and cultural relations failed to meet expectations on either side.[29] Tiananmen provided further provocation for a reassessment, which is likely to bring significant change in bilateral relations.[30]

Tiananmen occurred just before France's bicentennial celebration of human rights, the French Revolution. President Francois Mitterand immediately condemned China's leaders as "unfit to govern," the harshest criticism by any Western leader. Chinese student demonstrators wearing black mourning arm bands were given the place of honor leading the July 14 Champs d'Elysse parade extravaganza, replacing Chinese acrobats. A succession of leading Chinese dissidents, smuggled out through Hong Kong, were steered toward political asylum in France. Since Charles DeGaulle's 1964 opening to China, symbolic affinity has been at the heart of the Sino-French relationship: "France is the China of Europe; China is the France of Asia." After Tiananmen, the affinity collapsed, the symbolism reversed, and a hard-headed realism has now emerged.[31] The subsequent "freeze" in Sino-French relations may have been deeper than with any other country. The highly centralized nature of educational and scientific ties with China, funneled through the French Foreign Ministry, held them hostage to the declining political relationship. Yet, a surprising number of programs continued. During 1989–90 France maintained its flagship Wuhan University program, reduced but continued its French language program, and selectively continued scientific programs. The Centre National de la Recherche Scientifique (CNRS), comprising institutes throughout France, postponed all programs with China save the most important—the Kunlun Geotraverse. Geological exploration of China is one of France's highest scientific priorities, and the large six-month expeditions had long been planned for the summer of 1989. After debate at the highest level of French government, the expedition went ahead as scheduled, but only after the Chinese pledged to avoid all publicity.

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[28] Interview with Nicola MacBean, Great Britain China Centre; Allison Cooper, British Academy; Tim Callan, Marilyn Goodwin, Thelma Howard, British Council, November 14-15, 1989; David Marer, British Council, Beijing, March 8, 1990; Wu L[illegible]gmei, Chinese Academy of Social Sciences, March 9, 1990. See also David Shambaugh, "The British Council/Economic and Social Research Council China Exchange Scheme; A Programme Review, 1980-1989," February 28, 1990.

[29] Jean-Luc Domenach, "Sino-French Relations: A French View," in Chun-tu Hsueh, *China's Foreign Relations: New Perspectives* (New York: Praeger, 1982). Jean-Pierre Cabestan, "Western Europe in China's New World Strategy," Paper presented at China Symposium, Oiso, Japan, June 1989.

[30] This assessment and the information that follows is based primarily on the following interviews. Annette Alfsen, CNRS; Claude Cadart, CNRS; Jean-Claude Rossignol, CNRS; Claude Aubert, Institut National de la Recherche Agronomique Economie et Sociologie Rurales; Pascal Meunier, Ministry of Foreign Affairs; Michel Culas, Ministry of Foreign Affairs; Paul Jean-Ortiz, Ministry of Foreign Affairs; Jean-Pierre Baudry, Ministry of Foreign Affairs; Yves Chevnier, Ecole des Hautes Etudes en Sciences Sociale. All interviews conducted the week of July 9, 1990, Paris. Also Bernard Commere and Maurice Oberreiner, French Embassy, Beijing, March 7, 1990.

The hiatus in social science and humanities programs was more complete, and, with individual exceptions, continued through the summer of 1990. Social science exchanges are largely negotiated through the French Foreign Ministry, compounding their political sensitivity. With a number of Chinese social science leaders taking initial refuge in France, including Zhao Fusan, Vice-President of the Chinese Academy of Social Sciences, and Yan Jiaqi, Director of the Academy's Political Science Institute, neither the Chinese nor the French have been prepared to resume official bilateral relations.

Since January, and especially during the summer of 1990, there have been some efforts to improve Sino-French relations. The French decision not to sell frigates to Taiwan in February reversed the downward political spiral, and may have been linked to Chinese responsiveness to French bids for the Guangdong metro contract. (Among the French economic disappointments were the loss of the Shanghai subway contract to Germany, and the Beijing contract to the United Kingdom.) French scientists in fields ranging from agriculture to oceanography to geophysicists revisited China, exploring the potential for resuming normal scientific ties. A number of Sino-French scientific conferences were convened in France. An office of the Alliance-Francaise opened in Shanghai, as if to give some hope to France's long-standing interest in reestablishing its historical cultural presence.

In July 1990 an official French delegation was dispatched to China to begin negotiations toward the formal resumption of scientific and education relations. Amid these signs of normalcy, however, it is also clear that Tiananmen dealt a major blow to Sino-French cultural and scientific relations. Although the quasi-independent CNRS reported level funding for scientific programs with China for 1990–91, the French Foreign Ministry, which funds most other Sino-French scientific and educational programs, almost halved the 1990–91 China budget (from 50 million francs to approximately 30 million francs). During the same period French support for similar programs with Vietnam suddenly rose to 50 million francs. Long-standing frustrations with China, new opportunities in Vietnam (where residual French culture is much stronger), and most important, in East Europe, are widely cited by both Chinese and French as reducing and ultimately reshaping the future of French involvement with China.

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[31] See, for example, Francis Deron, "La Chine de M. Peyrefitte," *Le Monde*, July 11, 1990, p. 1, 4.

THE FEDERAL REPUBLIC OF GERMANY

Tiananmen evoked a German public outpouring of anti-Chinese government sentiment nearly equal to that in France, but its complex bilateral network has been less severely disrupted. Two June Bundestag denunciations officially curtailed new commercial credits or economic assistance, the backbone of German scientific and educational cooperation with China. Many individual German states, or *Landers*, which had been leaders in Sino-German cooperation, took even more punitive measures. In some states, university professors were discouraged from China travel: they had to take an official leave of absence to do so. Yet, this decentralization, which characterizes Sino-German cooperation, also provided the flexibility which France lacked. Within Federal agencies and private organizations alike, the operational policy that emerged was: "the continuation of cultural, scientific, and educational relations without contributing to the prestige of the regime." [32] As one German official explained it, "within these guidelines, we have been as flexible as possible." [33]

German scientific and educational cooperation with China is second in scope and size only to the United States, and is characterized by a network of cooperative projects in China.[34] By fall, many of these projects and institutes had resumed their China operations.[35] This included German advisors in Tibet, scientists in the Sino-German Cell Development Institute in Shanghai, instructors in vocational education institutes, language teachers in the Göethe Institute, and professional staff in the Beijing, Chengdu, and Shanghai offices of the Frederich Ebert Foundation.

At home, key German academic bureaucracies and institutions endeavored to preserve China relations. The Max Planck Gesellschaft Institute, like the French CNRS, decided not to cancel a large-scale geological expedition. Following internal debate, the Max Planck Gesellschaft Institute (encompassing more than 30 institutes) also decided to renew its 2 million DM agreement with the Chinese Academy of Sciences, six months early. Many German institute heads opposed the extension, citing loss of enthusiasm for cooperation with China. But, a March 1990 visit from CAS President Zhou Guangzhao personally convinced Max Planck President Staamb of the urgency of reaffirming external support for Chinese science. Likewise, Dr. Heinrich Pfeiffer, Secretary-General of the prestigious Humboldt Foundation, was personally involved in negotiating the continuation of Humboldt programs for Chinese scholars with the Beijing government. Even more important to China, the Federal Ministry of Industry and Technology and the Ministry of Economic Cooperation continued many of their ongoing scientific programs with China's State Scientific and Technical Commission and numerous related agencies.

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[32] Interview with von der Heyden.

[33] Interview with Hans-Deiter Scheel, Ministry of Foreign Affairs, Bonn, Germany, July 16, 1990.

[34] For a comprehensive survey of German relations with China see Erhard Louven and Monka Schader, *Wissenshaftliche Zusammenarbeit Zwischen der Volksrepublic China und der Bundesrepublik Deutschland* (Hamburg: Institute of Asian Studies, 1986).

[35] The summary that follows is based on the interviews cited above and the following additional interviews. Frank Mann and Christine Althauser, German Embassy, Beijing, March 8, 1990; Werner Menden and Peter Gottstein, Federal Ministry for Research and Technology, Bonn, July 16, 1990; Dietrich Papenfuss and Heinrich Pfeiffer, Humboldt Foundation; The-Quyen Vu, Friedrich Ebert Foundtion; Joachim Wiercimok, German Research Council; Bonn, July 17, 1990. Barbara Spielmann and Dietmar Nickel, Max Planck Institute, Munich, July 23-24, 1990; Rudolph Wagner, University of Heidelberg, Heidelberg, July 13, 1990; Manfred Lindau and Munchend Imohl, German Institute for Technical Assistance, Eichborn, July 12, 1990.

Germany's technical assistance to China has included more than 60 million DM annually for science and education, linked in many instances to economic development in fields of commercial interest to Germany. Although G7 sanctions curtailed new grants, Germany joined Japan in Summer 1990 in signaling the resumption of these programs. In July, Dr. S. Lengl, Minister of Economic Developement, travelled to China and signed new agreements opening two national research centers for vocational education. Vocational education has been the single most important German program, absorbing more than 50% of the technical assistance budget. Lengl's visit, the highest-level German political visit since Tiananmen, clearly signaled that Germany would continue its involvement in China's scientific, educational and economic development.[36] Nonetheless, strains in educational activities and funding persist. As elsewhere there is new difficulty in recruiting German scientists for participation in China-based activities. More Chinese students and scholars are remaining in Germany. Several years ago, the Chinese Ministry of Education complained that Chinese students failed to return from Germany. This is now a reality as individual states are continuing to extend visas. There are perhaps as many as 4,000 Chinese students and scholars in Germany with significant concentrations at selected universities: at the University of Heidelberg there are more than 500 Chinese students and scholars. Although the numbers of new Chinese students and scholars arriving in Germany remain stable, there are changes in the patterns of study. The Volkswagen Foundation was recently informed that China cancelled several German-funded Ph.D. programs for Chinese students. German funding for cooperation with China, heretofore on the increase, is beginning to decline. The opening of East Europe, German responsibilities toward a newly reunified country, and apathy toward China will certainly reduce future support.

The pre-Tiananmen strength of Sino-German relations, the close personal relationships that many senior German institutional leaders had developed with Chinese academic leaders, and the decentralized independent role of key national institutions have, however, protected the basic framework of Sino-German cooperation. In a year which began with East Germany avoiding "the China solution," and ended with national reunification, this was no small accomplishment.

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[36] *Xinhua*, July 10, 1990, in FBIS, July 11, 1990, p. 10. "Concept & Implementation of Institutes for Vocational & Technical Education & Training," State Education Commission, Ministry of Labor, Gesellschaft Fur Technische Zusammenarbeit (May 22, 1990).

JAPAN

Sino-Japanese relations have gained new salience in the post-Tiananmen period.[37] While acquiescing in international economic sanctions, Japan is leading the way toward overall renormalization. Scientific and educational relations, long relatively underdeveloped, have become an important arena for sustaining and even expanding the relationship.

Given geographical proximity and cultural affinity, post-Mao Sino-Japanese educational and scientific relations had been relatively slow to develop. At the beginning of the century more than 300,000 Chinese students may have studied in Japan, but in 1985 only 2,730 were enrolled in Japanese colleges and universities, close to the numbers of Chinese studying in the Federal Republic of Germany.[38] Science officials in both countries repeatedly complained about the modest level of scientific collaboration. For example, Japan in 1988 still ranked fifth among the Chinese Academy of Sciences foreign partners, behind not just the United States and Germany, but also France and the United Kingdom. Intellectual relations were eclipsed by the rapid development of Japanese technical assistance projects that provided all-important grants, but did not necessarily nurture higher level professional collaboration, more extensively developed in China's scientific relations with West Europe and the United States.

As economic, political, and cultural problems between the two countries intensified in the mid-1980s,[39] both governments sought to strengthen educational relations as a long-term buffer. China increasingly benefited from Japan's "internationalization" of higher education: by 1988 nearly 8,000 Chinese were enrolled in Japanese institutions of higher learning. The exchange of prime ministerial visits in 1988 and 1989 also promised increased cooperation in science and education, primarily to be funded by Japan. At the time of Tiananmen, plans were under way for numerous new initiatives—an expanded scientific agreement, secondary school programs, a Ph.D. program in Japanese studies at Beijing University, a bilateral environmental research institute, and a huge cultural center for Sino-Japanese student exchanges and cultural events in Beijing.[40] The only nagging new issue in cultural relations also resulted from Japanese relaxation of student visas: a sudden influx of more than 40,000 Chinese language students in 1987 and 1988. Attracted by frequently fraudulent language programs and the lure of jobs, most Chinese in Japan at that time quickly disappeared into Japan's growing underclass of foreign workers—waiters, prostitutes, and hospital workers. China accused Japan of exploiting

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[37] Kim Hong-nack, "Perspectives on Recent Sino-Japanese Relations," *The Journal of East Asian Affairs* (Summer/Fall 1990), pp. 403–435.

[38] *Student Outflows between Japan & China, May 21, 1987,* Ministry of Science and Education, Tokyo, Japan.

[39] Allen S. Whiting, *China Eyes Japan* (University of California Press, Berkeley, 1989); Laura Newby, "The Linkage between China's Domestic Politics & Foreign Policy as Reflected in Sino-Japanese Relations," Paper Presented at China Symposium, Oiso, Japan, June 1989.

[40] Interviews with Kanema Ikeda, Science and Technology Agency, Tokyo, June 26, 1989; Masayoshi Enomoto, Japan International Cooperation Agency, Tokyo, June 27, 1989.

Chinese youth, and the problem of Chinese student workers became hotly debated in the Japanese press.[41]

The Tiananmen events, broadcast live in Japan as elsewhere, brought an immediate, but fairly short-lived, suspension of most Sino-Japanese intellectual activities. Chinese students resident in Japan, critical of the Chinese regime, became temporary media figures, although not to the same extent as counterparts in the United States and Europe. Japanese faculty in the Japanese Studies Program at Beijing Normal University returned home, and the Japan Foundation temporarily cancelled most of its programs. Likewise, scientists under the auspices of the Japan Society for the Promotion of Science returned from China. The Japanese Chinese Studies Association voted to discontinue travel to China.[42]

Many Japanese intellectuals urged that the Japanese government take a more condemnatory attitude toward the Deng regime. Formal statements by Japanese political leaders did become more critical as Chinese executions continued, and Western leaders urged Japan to join in censuring China. Japan eventually postponed large-scale credits and technical assistance grants. But Japanese political leaders and academics alike also maintained that Japan had a special (more realistic) understanding of China and that China should not become internationally isolated.[43]

It is within this context that Japanese intellectual relations with China have evolved during the post-Tiananmen year. The suspension of Japanese credits and grants, particularly the 810 billion yen economic assistance grant, had more impact on the Chinese economy than all other bilateral international sanctions. Faced with escalating Chinese pressure to resume loans and grants, Japan has endeavored to be flexible in other areas. The Japanese government initially quietly managed two emotional issues—requests for visa extensions by Chinese students and the ongoing visa, social, and economic problems of Chinese student workers. Selected Chinese students, legitimately concerned about their political vulnerability, were quickly given visa extensions, and public and private organizations provided emergency financial assistance. Restrictions on Japanese language schools and tighter Japanese visa restrictions, efforts which had begun just before Tiananmen, continued. The flood of Chinese language students slowed.

Japanese and Chinese organizations reported that almost all Chinese visiting scholars returned to China after Tiananmen, and that most official educational exchange programs continued unimpeded during 1989–90. For the first time, however, Chinese Ph.D. students began to remain in Japan. China's State Education Commission reported that 90% of the Chinese Ph.D. candidates scheduled to return from Japan in 1989 failed to do so, in contrast to a 90% return rate the previous year. Long-term employment possibilities are limited, but Japanese companies are providing extended contracts for well-trained Chinese scientists and engineers.[44]

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[41] Interview with Hajime Wakabayashi, Ministry of Education, Tokyo, June 27,1989; Interview with Peng Jiasheng, Education Counsellor, Chinese Embassy, Tokyo, June 28, 1989.

[42] Interview with Masaharu Yamada and Akira Oguma, Japan Foundation, Tokyo, June 23, 1989; Interview with Nakahide Onozawa and Shigeru Torigai, Japan Society for the Promotion of Science, Tokyo, Japan, June 26, 1989.

[43] *Mainichi Daily News*, June 23, 1989, B12; June 25, 1989; *New York Times*, June 20, 1989, A2; "China is China and the West Best Not Forget," *The Japan Economic Journal*, July 29, 1989, p. 11.

The flow of individuals between China and Japan remained well below previous levels during the fall and spring of 1989–90. Both Chinese and Japanese officials, however, made numerous efforts to reinvigorate cultural, scientific, and educational ties.

Tiananmen initially postponed plans to expand the Sino-Japanese bilateral scientific program. But in January 1990 the two sides met in Beijing and signed a new Science and Technology Agreement. The new agreement, which focused on agriculture, the environment, and oceanography, more than doubled the previous level of cooperative efforts. While still behind levels of European and American scientific cooperation with China, this accord marked a new stage in Sino-Japanese scientific cooperation, and both sides expressed satisfaction with the results. Zhou Guangzhao travelled to Japan in the spring, negotiating agreements for closer cooperation between CAS and the Ministry of International Trade and Industry (MITI). Negotiations resumed on plans for the Japan-funded modern environmental research center to be built in Beijing. And the scientific exchanges sponsored by the Japan Society for the Promotion of Science continued more or less as before.[45]

In the summer of 1990, Sino-Japanese relations accelerated, with the Japanese government signalling that both economic and cultural relations should resume pre-Tiananmen patterns. This renormalization was spurred on by the Houston Economic Summit's tacit approval for Japan's resumption of economic assistance grants and loans to China. In a broader sense, Prime Minister Kaifu met repeatedly with visiting Chinese commercial, educational, and cultural delegations, publicly calling for increasing contacts. To avoid criticism from China, but amid growing controversy within Japan, the Japanese government began to take a stricter position concerning Chinese dissidents, delaying visa extensions and threatening forcible repatriation. In this context, Li Tieying, State Councilor, Minister of Education, and spokesman for China's more restrictive study abroad policy, visited Japan in July.[46] His official visit, including symbolic meetings with Prime Minister Kaifu and Chinese students, could not have been duplicated in the United States or Europe in the summer of 1990.

As controversy over the political role of Chinese students in Japan demonstrates, these overall trends do not mean an end to the many cultural and economic tensions between China and Japan. It is clear, however, that scientific and educational relations between China and Japan were less hurt by Tiananmen than those with Europe and the United States. Indeed, they appeared to continue a trend toward overall improvement which pre-dated June 4. During the 1990s, they are likely to be a more important component of the overall Sino-Japanese relationship.

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[44] Interview with Yu Fuzeng, State Education Commission, Beijing, March 7, 1990.

[45] Interviews with Wu Yikang, Li Shubao, State Science and Technology Commission, Beijing, March 2, 1990; Cheng Erjin, Chinese Academy of Science, Beijing, March 5, 1990; Yasuo Nazaka and Tsuyoshi Yamaguchi, Japanese Embassy, Beijing, March 8, 1990.

[46] Asia Watch, "Japan: Harassment of Chinese Dissidents," October 4, 1990. *Xinhua*, June 30, 1990 in *FBIS* July 2, 1990, p. 4; *Xinhua*, July 2, 1990 in *FBIS*, July 3, 1990, p. 3; *Xinhua*, July 4, 1990 in *FBIS* July 5, 1990, p. 9; *Renmin Ribao*, July 24, 1990, in FBIS, July 26, 1990, p. 6.

III. RENORMALIZATION? THE CONSEQUENCES OF TIANANMEN

Fifteen months after Tiananmen there is increasing talk of renormalization, not just in Japan but in Europe and the United States as well. In the mid-1970s, normalization meant the establishment of diplomatic relations and governmental cooperation ranging from medical to military. For the Chinese government today it means the resumption of higher-level political ties and the removal of economic sanctions. This has already begun. More senior officials have resumed their trek to Beijing, and Japan's resumption of economic assistance and loans is likely to be followed elsewhere. But outside Beijing, renormalization still carries an additional connotation: continued progress toward human rights and political reform *in* China. By their very resumption, cultural and intellectual relations with China are again at the cutting edge of that agenda. Beyond normalized political discourse and economic cooperation with China, the deeper cultural and societal contours of post-Tiananmen Sino-Western relations are taking shape. There is more continuity than change.

First, the continuity. The tenacity of cultural, scientific, and educational institutional connections with China is rather remarkable. For all their initial and particular differences, the post-Tiananmen responses to China in Europe, Japan and the United States have many similarities. It is as if once relations were reestablished in the post-Mao era, no one (on either side) wants to let go. Even in France and the United States, where the reaction to Tiananmen was most negative, a gradual resumption of intellectual relations is taking place. Overall, this is in part the result of vested bureaucracies, public and private, national and international, with well-defined interests in the China relationship. Beyond bureaucratic self-interests, however, friendships, working relationships, and the desire to continue ongoing projects have provided much of the renewed momentum. In a deeper sense, despite far greater political and economic uncertainty, Tiananmen has not dissipated the historic Western desire to be involved in China's modernization.

In China there has also been continuity. "Open-door" policy proclamations have proved valid. Thousands of students and scholars continue to go abroad for short visits and long-term training. Internal Chinese assessments of international scientific relations reaffirmed the necessity of foreign collaboration.[47] Accordingly, China has embarked on a new stage of scientific and educational diplomacy designed to reassure the outside world. Continuity in most academic leadership positions has contributed to this effort.

Two old issues have become more acute: brain drain reality, and constraints on the international flow of science and technology. These are essentially North-South issues, pre-dating Tiananmen.

Brain drain reality, exacerbated by Tiananmen, has dictated significant changes in Chinese educational policies and has created grave problems for Chinese scientific and educational institutions. During the first post-Tiananmen year, 1989–90, there was little appreciable change in the outward flow of students and scholars. For the most part, foreign visa and immigration limitations, not Chinese restrictions, determined the numbers and categories who left China. Since January 1990, however, new restrictions on study abroad for immediate post-B.A. and post-Ph.D. students have been announced. France, Germany, the United Kingdom, and selected programs in the United States report a decrease in Ph.D. candidates and some enforcement of the requirement that they all be at least 35 years old. Visa statistics for the United States also illustrate the change in general categories studying abroad, if not the age of the applicants or the degree being sought. The numbers of new students and scholars leaving for the United States has increased slightly since 1988. There has, however, been nearly a 100% increase in visas (self-sponsored), and a corresponding decrease in J1 visas (officially sponsored).[48]

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[47] Interviews with Wang Dan and Kong Deyong, State Science and Technology Commission, Beijing, March 2, 1990.

There is every indication that the numbers leaving China will remain high, and visa applications are overwhelming foreign embassies. Once again China's remaining intellectual community, faced with yet another "lost generation," is confronted with the need to revitalize its own institutions. The loss of morale and momentum is palpable. Those who have stayed are politically sympathetic with those who leave or do not return, but are also increasingly supportive of government restrictions designed to prevent further "brain drain." Even a rapid return to political reforms will not fully solve these problems. Sino-Western educational relations during the 1990s will confront an increasingly complex agenda that requires mediation between the growing numbers of disaffected Chinese students and scholars remaining abroad, the continuing outward flow of intellectuals, and pressing domestic needs.

Prior to Tiananmen, the emerging issue in China's international scientific relations was a more intense clash on issues such as intellectual property rights and high technology cooperation. Deng Xiaoping's "science is a part of the wealth of all mankind" sounds idealistic today. His science minister's recent "self-reliance" statements evoke more contemporary reality. While others warned of the dangers of foreign ideas, Song Jian has consistently reaffirmed the critical role that foreign scientists and scientific ideas have played in China, beginning with Mateo Ricci. Nonetheless, he also repeatedly warned that in an era of increasing techno-nationalism, China is ready to go it alone:

> Cooperation in any field of science and technology, especially in high technology, must be based on our own strength. We must put emphasis primarily on self-reliance instead of cherishing any unrealistic illusion. . . . A nation that is incapable of gaining superiority with the aid of science and technology in the international arena will only find itself in a position of being neglected, discriminated, and exploited. . . . High technology has become a weapon in the hands of certain Western countries to bully and op-

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[48] Glenn Shive, "New Rules on PRC Students Studying Abroad: Who Can Leave, Who Cannot, and Why," IIE Report, March 23, 1990; "China Reforms Its Policies on Officially Sponsored Students Going Abroad," IIE Report, October 1990; "New Restrictions Stimulate the Flow of Self-Sponsored Students from China to American Universities," IIE Report, October 1990. Interview with Yu Fuzeng, March 7, 1990.

> press . . . it has also become an important means for them to exploit and plunder the resources of developing countries. . . .[49]

As international scientific relations are restored, this rhetoric may recede. But these statements, and others like them, reflect Song Jian's understanding of growing constraints on the flow of science and technology across national boundaries.[50] Tiananmen, and the temporary hiatus in scientific and technological relations, has only toughened the position of Western negotiators. As West Europe, Japan and the United States begin to renew or extend their scientific and technical agreements with China, one may expect less flexibility in areas of advanced technology. Continuing debate over the nature of international scientific and technological cooperation between China and the West, including Japan, should be expected.

This relative continuity does not mean that 1989 will not be a watershed in Sino-Western cooperation. Two changes are directly linked to Tiananmen and the collapse of China as a reform model. First, as is evident in the preceding discussion of European and American relations with China, East Europe and the Soviet Union have become the new models of reform. This has resulted in the shift of some resources and enthusiasm away from China. European technical assistance programs have made major contributions to China's scientific and educational infrastructure. Although these programs are now resuming, it is not likely that they will continue to expand; more likely they will be reduced in the immediate future. It is most unlikely that the United States will consider technical assistance for China, leaving multilateral organizations, private foundations, and universities to define the parameters of assistance. The net result will be an enhanced role for Japan, which is already expanding rather than reducing funding for science and education in China.

Second, there is now overt linkage between resuming intellectual cooperation with China and China's political reform process. Perhaps the most powerful result of Tiananmen was the politicization of international scientific and educational exchanges. The rationale for the resumption of ties has become more explicitly political and ideological: a distinction between cooperation with the government and cooperation with the people, the expressed hope that continued exposure to Western ideas and intellectuals will nurture the now-repressed seeds of political reform.

The combination of these various pre-and post-Tiananmen trends and expectations suggest that the future course of China's intellectual relations with the West will be difficult. China's post-Cultural Revolution structure of international relationships has emerged remarkably intact from Tiananmen, but inherent contradictions persist in its ongoing encounter with the West.

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[49] *Xinhua*, May 24, 1990, in FBIS June 8, 1990, p. 25. See also Song Jian, "Science and Technology to the People," State Science and Technology Commission, December 1989; *Qiushi*, No. 19, October 1, 1989 in *JPRS*, December 14, 1989, pp. 5–11.

[50] Kenneth Keller, "Science and Technology," *Foreign Affairs* (Fall 1990), pp. 123–139; Robert Reich, "The Rise of Techno-nationalism," *Atlantic Monthly* (May 1987), pp. 63–69.

PERSPECTIVES ON CHINA'S BRAIN DRAIN

By Leo A. Orleans *

CONTENTS

Page
I. Introduction 629
II. The Chinese Perspective 630
    A. The First Ten Years (1979-89)—A Review 630
    B. After Tiananmen 632
III. The U.S. Perspective 635
IV. The Students' Perspective 638
V. A Personal Perspective 641

I. INTRODUCTION

Since the end of World War II, many thousands of young people from less-developed countries have come to the West, especially to the United States, to pursue higher education. While many return home after completing their training, others manage to change their student status and remain abroad. This flight of intellectual capital from developing countries—which has come to be known as "brain drain"—is usually of concern only to governments losing potential professionals and to scholars of labor and migration trends. The situation of Chinese students and scholars now in the United States, however, has caught the attention not only of bureaucrats and scholars, but of a large segment of the American population. There are several reasons for this. First, the 50,000 Chinese students and scholars now in the United States—more than from any other single country—are scattered throughout the country, and thus have contact with many Americans. Second, the Chinese students' reputation for being bright, hard-working, and personable has spread well beyond the academic community. Third, many of the students have found ways either to remain in this country or to postpone their return, providing them with additional opportunities to meet and interact with large numbers of Americans.

But most important in capturing the sympathy of the American people for the Chinese students studying here were the Tiananmen Square demonstrations in April–May 1989 and their tragic culmination on June 4. Every night for weeks, televisions in American homes featured images of Chinese students in Beijing marching, making speeches, and crying in an emotional plea for understanding. Interviews with Chinese students in this country also served to

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highlight the link between the students' aspirations and the American ideals they professed. Millions of Americans began to feel as if they knew these students personally, to sympathize with their cause, and eventually to support their efforts to remain in the United States. And indeed, the tragedy of Tiananmen provided many Chinese students with at least a temporary reprieve in their duel with the U.S. Immigration and Naturalization Service (INS).

II. THE CHINESE PERSPECTIVE

Over the past ten years Beijing's policy regarding sending students and scholars abroad for advanced study has evolved but never wavered. Surprisingly, even after Tiananmen, when many students in the United States publicly declared their intentions not to return to China until the current regime has passed from the scene, the composition of individuals permitted to leave China was somewhat changed, but their flow did not abate.

A. THE FIRST 10 YEARS (1979–89)—A REVIEW.

Chinese students have been going abroad for knowledge and know-how for a century now. Until 1949 most went to the United States, Europe, and Japan; in the 1950s, the flow shifted to the Soviet Union. Except for language training, few Chinese students studied abroad during the 1960s and most of the 1970s while China isolated herself from both East and West. The overseas flow finally resumed after Mao's death.

In 1979, with the normalization of relations between China and the United Sates and after China's shift in priorities from security considerations to national modernization, access to foreign—especially American—scientific and educational institutions became an important short-cut in acquiring the knowledge and experience of the previous two decades. The first wave of Chinese who came to the United States were, for the most part, older scholars from the institutes of the Academy of Sciences and universitites under the then-Ministry of Education, with previous training in the West or Japan. They went abroad to catch up with advances in their disciplines and renew contacts. Gradually, however, as Chinese educational institutions began to overcome the setbacks of the Cultural Revolution, the pool of younger individuals qualifying for admission to foreign universities increased, and as a result, so did the number of degree-seeking students coming to the United States.

During the 1980s the issue of sending students abroad was discussed at various official levels, as well as in educational and scientific institutions, and several national conferences were held to discuss policy.[1] While rules and regulations were made and changed and implementation varied between provinces and between institutions, the basic aim was to get as many students and scholars into foreign universities and research institutions as Chinese funding and foreign scholarships would allow. Soon, "study-abroad fever" swept China's urban youth and gathered so much momentum that it was almost impossible for the authorities to control. Between

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[1] Much of the information in this section was adapted from my *Chinese Students in America: Policies, Numbers and Issues* (Washington, D.C.: National Academy Press, 1988)

1979 and mid-1989, the U.S. Immigration and Naturalization Service issued some 80,000 visas to Chinese students and scholars, of whom about two-thirds came on J-1 visas, issued to government-sponsored individuals, and one-third on F-1 visas, issued to students sponsored and supported by family or friends.

Beijing was aware of the considerable risk involved in sending so many of the brightest scholars abroad but concluded that the non-return of some would not negate the value of the exchange programs. Throughout most of the 1980s this was a relatively easy conclusion to sustain, since most of the students were still in the midst of completing their studies abroad in the United States and the question of return was not yet at issue. Moreover, at least through 1986, almost all of China's government-sponsored and perhaps a fifth of the self-supporting students and scholars returned home upon the completion of their studies. Thus, it was not until 1987—when two developments brought the issue to the fore—that the likely non-return of a large proportion of students created a minor crisis in government circles.

In December 1986 and January 1987, what started as relatively mundane student demonstrations protesting campus conditions and job assignments took on political overtones when a handful of participants (supported by some off-campus intellecuals) added democracy and human rights to the list of demands. Beijing's efforts to minimize the significance of the demonstrations faltered when conservative elements in the leadership forced the expulsion of some highly placed intellectuals from their posts and dismissed Hu Yaobang as general secretary of the Communist Party. Immediately, students both in China and on American campuses assumed that fewer Chinese would be permitted to come to the United States—the cradle of "bourgeois democracy." By late 1987, however, it became clear that China was not reversing economic reforms, closing the door to the outside world, or, for that matter, altering the policy of sending students and scholars to the United States.

Unfortunately for the Chinese, the student demonstrations in January 1987 also occurred at a time when much larger numbers of students were completing degree programs in the United States. Doubts about China's ability to utilize their new skills and a nagging unease about political prospects at home were reinforced by the government's reaction to the demonstrations and widespread uncertainty about China's policies regarding foreign education. As a result of the perceived political instability and uncertain future, many more students in the United States began to seek ways to remain in this country or postpone their return.

For its part, the government was trying to mitigate the situation by proposing measures to influence students to return, and by changing the student and scholar selection process to reduce the future likelihood of defection.

Measures intended to persuade students to return have had little success. During the past decade of impressive economic progress, the government has failed to make good on promises to increase salaries and improve living conditions for intellectuals, many of whom lag behind workers in these respects. Directives instructing work units to give special considerations to returning scholars were resented by colleagues who did not have an opportunity to go abroad, and were therefore ignored or unevenly implemented.[2] A more creative and, if more scholars were returning, a more practical step was the establishment of "open research laboratories." These independently funded entities are affiliated with institutes of the Chinese Academy of Sciences and some of the major universities. In addition to providing a supportive research environment for some of China's top scientists, these laboratories also serve as temporary workplaces for returning Chinese PhDs in science and engineering, until it can be decided where best to apply their skills.

While attempting to smooth the way for returning students, Beijing also approached the problem from the other end by changing selection policies to decrease the likelihood of non-returns. First, visits to American universities by officially sponsored individuals were limited almost entirely to older scholars, who would remain abroad for a shorter period of time. Second, the number of scholars sent by the State Education Commission and the universities under its control would decrease, while more individuals would be sent by their *danweis* or work units. Study programs for these individuals, also older, would be attuned to the needs of the work unit, to which they would return. From Beijing's perspective these are indeed reasonable steps which are likely to achieve their goals.

Broadly speaking this was the situation when all hell broke loose in Tiananmen.

B. AFTER TIANANMEN

Following the violent suppression of students and their supporters in Tiananmen Square, there was great confusion regarding the future of foreign study, especially in the United States.

Since Chinese leaders had no doubt that the "very small number" of students who "fabricated lies about the government" were under the influence of Western political and capitalist forces, students were convinced that Beijing would take drastic steps to stop or sharply cutail study opportunities in the United States. Numerous statements by high Chinese officials that the open door policy would not change and that students and scholars would continue to be able to study abroad seemed to be contradicted by some depressing new regulations. It was reported, for example, that freshmen entering Beijing and Fudan Universities would first have to undergo a year of military training. On the other end of the educational system, after graduating and before starting their work assignment to a permanent work unit, all university graduates were to spend at least a year in practical work or manual labor at the "grass roots level." This was to serve two purposes: first, to provide—even on a temporary basis—college-educated individuals to work in units which sorely lack them; second, to give college graduates "an opportunity" to "get in touch with workers and farmers and cultivate the habit of bearing hardships"—a disturbing throwback to Maoist years.[3]

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[2] See, for example, Leo A. Orleans, "China's Changing Attitude Toward the Brain Drain and Policy Toward Returning Students," *China Exchange News*, June 1989, p.2.

[3] This practice, as it is practiced by the Capital Steel and Iron Company in Beijing, is described in *Beijing Review*, Oct. 29–Nov. 4, 1990, p. 29.

Regardless of how strictly enforced or how widely implemented, the return to the glorification of practical work and manual labor—intended to "combat Western democratic influence"—was upsetting to all college students and did not seem to bode well for any young person wishing to pursue advanced education abroad. Throughout this period, then, many contradictory signals came out of Beijing that left students and foreigners alike confused as to whether, which, and how many students would be allowed to study in the United States. It was an atmosphere ripe for rumors.

The most authoritative early policy statement on sending students abroad was made by He Dongchang, vice-minister in charge of the State Education Commission, in an August 1989 interview with the weekly *Liaowang.*[4] The reporters asked He to respond to author Han Suyin's charge that the tragedy in Beijing was directly linked to the policy of letting students study abroad. The vice-minister reiterated that the sending of students and scholars abroad was a fundamental national policy and would not change, but then acknowledged that the "turmoil-turned-riot" in Beijing made it necessary to place a "screen" over the open door to prevent "flies and worms" from passing through it.

He Dongchang went on to explain that in the last 10 years China's higher education system, including the graduate level, had been greatly improved, so that in the future most students seeking graduate degrees would be able to obtain them in China. But while the number of state-sponsored students sent abroad for advanced degrees would be sharply reduced, the number of visiting scholars would be "considerably increased." Furthermore, by stating that "we cannot confine openness to just a few developed Western countries" he implied that in the future more students and scholars would go to other countries besides the United States. Finally, He stressed once again the need to improve the planning process so that foreign education would mesh with national needs. To illustrate the disparity between individual study programs and national needs, He claimed that 1,000 Chinese students in the United States are getting doctorates in optical physics—an obvious exaggeration.

Many of He's points were not new, but simply affirmed the changes that had already been announced prior to Tiananmen. But although his interview received much attention in the Western media, confusion and rumor persisted because some of his points were misinterpreted and some of the measures he described have not been implemented.

After months of deliberation came additional clarification of the new policies. In January 1990, the State Education Commission issued lengthy provisions, effective Feburary 10, for students going abroad at their own expense.[5] The stated intent of the document was to strengthen the "guidance and control" over these students by requiring them to work a specified number of years before going abroad in order to repay the state for their education. The length of service varied from two to five years and was determined by a confusing formula that takes into account level of education, type of school, full-time or part-time status of students, and then factors in the number of years of work experience an individual may have already had. The document did provide for an important exemption. Students with relatives overseas (and the word is that their number skyrocketed after the release of this document) could essentially buy their way out of China by paying fees ranging from 1,500 to 6,000 yuan.

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[4] Hong Kong, *Liaowang Overseas Edition*, Aug. 21, 1989; FBIS-CHI-89-166, Aug 29, 1989, pp. 16-17.

[5] "Announcement Concerning Promulgation of 'Supplemental Provisions for Personages with University Graduate and Postgraduate Qualifications Studying Abroad at own Expense,'" State Education Commission, January 25, 1990. A good discussion of this policy and its ramifications was published in *Kuang Chiao Ching* (Wide Angle), Hong Kong, April 16, 1990; JPRS-CAR-90-049, July 11, 1990, pp. 7-10.

Not surprisingly, the release of this document caused yet another media sensation, for it did indeed appear that "China Acts to Restrict Study Abroad," as the headlines proclaimed. In fact, the document's provisions are being implemented loosely if at all. The most dramatic proof of this is that while there had been some internal shifts in the composition of the new arrivals to the United States since June 1989, at least so far, there has been no reduction in overall numbers. On the contrary, their numbers have increased, as the following figures, released by the Chinese, show: [6]

Year	Privately Supported	Government Supported	Total
1988	4,771	1,159	5,930
1989	7,386	1,446	8,832
Jan. thru May	1,684	537	2,221
June thru Dec.	5,702	909	6,611

Similarly, U.S. data on the number of visas issued in China during FY90 (Oct. 1989–Mar. 1990) show a slight decrease in J–1 visas but a significant increase in the number of F–1 visas over the previous fiscal year. However, the final test of China's policies with regard to sending students and scholars to the United States may come in the fall of 1990—more than a year after Tiananmen.

Be that as it may, it is still appropriate to ask why is it that contrary to so many predictions, the Chinese government continues to permit students and scholars to come to the United States where, presumably, they pick up so many dangerous notions? A few reasons can be suggested.

First, science and technology are still seen as the answer to many of China's problems and the United States is still considered to be the most advanced country in these fields. Second, a sharp reduction in scientific and educational exchanges would send the wrong message not only to Washington but to American scientists and engineers in academic institutions and industrial enterprises, with whom Chinese colleagues have valuable contacts. Third, the Chinese continue to have a high regard for American higher education, with which so many Chinese scholars have had first-hand experience. Fourth, because of its image, reputation, and the large Chinese communities in many American cities, the United States continues to be the country of choice for the overwhelming majority of Chinese students and scholars. Putting a tight lid on the desire to study in the United States may have seemed too dangerous. And finally, since Beijing still hopes for the eventual return of the students now in the United States, restrictive policies toward study abroad would send the wrong message and any intimidation would have an opposite effect on the new generation of Westernized scholars. Instead, Beijing continues to promise better living and working conditions for the returnees and much publicity is given to those few who do return and receive "a warm welcome" and "preferential treatment." [7]

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[6] *Newsletter*, The Embassy of the People's Republic of China, Washington, D.C., May 12, 1990.

China's real hope, however, is that the special attachment the Chinese people have for their homeland will eventually draw them home. To show that ties with the motherland are not easily broken, they point to the large numbers of scientists and other professionals who returned to China in the early 1950s, to the support so many Chinese-American scientists provided after normalization, and to the eventual return to Taiwan of thousands of U.S.-educated scholars. Moreover, the thinking is that if and when they do return the scholars will have gained much more experience and they will be much better equipped to make important contributions to China's development. In the meantime, Chinese scholars in the United States will continue to maintain relations with many of their colleagues at home, and thereby serve as yet another channel through which knowledge and know-how can be transferred to China.

An official of the Ministry of Personnel summarized China's attitude toward students remaining abroad in a very straightworward way: "We should not have a prejudice against those who linger a bit. . . . What we should do is create a more attractive environment for them." [8]

III. The U.S. Perspective

The apolitical scientific and academic links between Chinese and American scholars and institutions were pursued with enthusiasm by both sides and have played a vital role in forging friendly ties between the two countries since the normalization of relations in 1979.[9] The most tangible sign that three decades of tension and suspicion were over was the ever-growing number of Chinese students on American campuses. Some Americans welcomed the new relationship because of sentimental attachments stemming from missionary and educational contacts through the first half of the 20th century, others saw China as an intellectual and scientific frontier without which our knowledge of the world would be sorely lacking, and yet others were simply thrilled with the novelty of having Chinese in our midst and showing them our country. Thus, through most of the 1980s a kind of love affair seemed to develop between the two countries. And at least until 1987, the question of

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[7] See, for example, *Renmin Ribao*, June 5, 1990; FBIS-CHI-90-114, June 13, 1990, p. 19.

[8] *China Daily*, Dec. 15, 1988, p. 1.

[9] For a detailed discussion of exchange programs and sponsors, see David M. Lampton, *A Relationship Restored*, (National Academy Press, Washington, D.C.,1986), Ch. IV.

"brain drain" and the potential problem of the non-return of Chinese students was of marginal concern to the U.S. government.

The cordial relations between China and the United States came close to the breaking point following Beijing's crackdown against the students in Tiananmen, and created a rupture between the Bush Administration and Congress. While President Bush was convinced that "this is not the time for an emotional response" which might jeopardize the entire relationship with China, the students' calls for democracy (and the vision of the Goddess of Freedom in Tiananmen Square) elicited a very different response on Capitol Hill, where a resolution supporting the democracy movement was quickly passed by voice vote. Members of Congress vied with each other to see who could come up with the most stirring rhetoric about the brave students who risked their lives to bring democracy to China and criticized the President for not taking more forceful actions to punish the Chinese government. To members of Congress already critical of China's policies regarding family planning and Tibet, the Tiananmen incident was further proof of China's disregard for human rights—a position that was greatly reinforced by what appeared to be an endless stream of Chinese students testifying about Beijing's atrocities.

President Bush did, of course, take immediate steps to show U.S. displeasure over Tiananmen, and an executive order was issued to assure a sympathetic review of requests by Chinese students in the United States to extend their stay when their visas expired. The order applied to all students in the United States on June 6, 1989 and, upon application, provided for an extension of all expiring visas for one year, until June 5, 1990.

Since students who came to the United States on F-class visas can apply for immigrant status as aliens seeking permanent residence, the order applied primarily to government-selected scholars with J-class visas who, according to the immigration law, could work in the United States for 18 months after finishing their studies, but had to leave the country for at least two years before changing to another nonimmigrant category or to permanent resident status.

Chinese students were not overjoyed by the executive order. Unsure what their status might be after one year and concerned that they would have to return to China or become stateless, many students felt that by accepting a deferred departure they would be making a public statement against their country and would be branded as counter-revolutionaries. Consequently, few applied for the extension while many slowed down their academic progress in order to hold on to their visas.

Convinced that if students returned to China they would be immediately arrested, many members of Congress felt that Bush's actions did not provide adequate protection. Several bills were introduced to allow students to remain here under the INS "hardship" provision, or to apply immediately for permanent-residency status. Most notable was the Pelosi bill, which would have allowed students to remain in the United States after their visas expired. The bill passed both houses of Congress by large majorities but ran into stiff and expected opposition by the White House. Bush, upset by what he considered to be Congressional intrusion on presidential authority, vetoed the bill, pointing out that existing administrative directives assure the Chinese students essentially the same protection. The attempt to override the veto succeeded in the House but failed by four votes in the Senate. Congressional pressure on the President did not stop, however, and on April 11, 1990 Bush issued an executive order formalizing all the administrative steps already taken and deferring until January 1, 1994 any deportation proceedings against Chinese who arrived in the United States before April 11, 1990.

Actions by Congress and statements by Bush elicited predictable complaints from the Chinese government for "interference in Chinese internal affairs and fomenting discord between the Chinese students and Chinese government." [10] Beijing voiced "great indignation and strong protest" to Bush, maintaining that his statements on changes in the status of Chinese students not only "undermined the educational exchanges," but did not take into account the long-term interests of the two countries. In fact, even those Chinese leaders who may have believed that there was American involvement in the anti-government demonstrations in June, knew very well that whatever Bush did or did not do with regard to Chinese scholars and students, would not cause them to run for plane reservations for the return trip. Characteristically, many of these protests and allegations were related to "face"—a show of displeasure that a situation which needed defusing through silence would be formalized through executive orders.

China's post-Tiananmen complaints about U.S. "interference" in the fate of Chinese students and scholars were more serious, but not new in themselves. For several years Beijing had expressed concern that not enough was being done by the INS and the U.S. Information Agency, which administers many of the national programs, to force Chinese nationals to comply with existing regulations and return home as scheduled. Moreover, they suspected collusion between the U.S. government and American professors—especially those working in mathematics, physics and chemistry—to appropriate China's most talented young scholars. Although no such plot exists (and the Chinese, most likely, know this), many American professors have indeed become dependent on the intelligent and hard working Chinese students as teaching and research assistants. And some of them lobbied hard (before and after Tiananmen) to find ways to keep the Chinese in this country.

Official U.S. sactions against China seriously affected most of the scientific and educational exchanges between the two countries: scientific and technical protocols signed by the two governments became inactive; federal funding for programs involving travel to China was stopped; the National Science Foundation drastically cut back its scientific exchange program with China; the National Academy of Sciences suspended its exchange programs; and many academic associations and universities put their programs with China on hold. As an aside, it should be noted that many scholars disagreed with the wisdom of cutting off scientific and academic contacts with China. This position was cogently expressed by Pierre

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[10] See, for example, *Xinhua*, July 26, 1989; FBIS-CHI-89-143, July 27, 1989, p. 24.

Perrolle: ". . . the type of broad-based progress reflected in the prodemocracy demonstrations in Tiananmen Square is not the result of U.S. pronouncements on democracy and human rights but the outgrowth of extensive direct contacts between Americans and Chinese." [11]

By the spring and early summer of 1990 tension between China and the United States had started to subside. China moderated her rhetoric, resumed the suspended Fulbright and Peace Corps programs, released several hundred imprisoned dissidents, and permitted Fang Lizhi and his wife to leave the country. And with the ending of the heated and divisive Congressional debate over the most-favored nation status for China—in which the Chinese student issue was frequently raised—the tension between Congress and the Administration regarding U.S-China policy has also been muted as of this writing.

IV. THE STUDENTS' PERSPECTIVE

It is not facetious to say that for a large number of Chinese students today, the primary concern about the "brain drain" is how to become part of it. This was not true earlier in the decade, when the desire to go abroad to study did not imply a desire to remain there. The gradual change in attitudes came as a result of professional considerations, the example of others (and safety in numbers), a desire for a better life style, and the lack of political reform to match the economic progress of the past decade.

It is not difficult to sympathize with the "study-abroad fever" which gripped the student population in the mid 1980s. By then, China's universities were graduating large numbers of bright youths who wished to do graduate work and, at the same time, "see the world." Students were aware that many of China's top academic and research positions were filled by individuals who received their education in the West prior to 1950, in the Soviet Union during the 1950s, or who were members of the somewhat younger crop of PhDs trained abroad after 1980. Since success seemed to be tied to foreign education, a "blind desire" to study abroad developed among students in Chinese universities, causing some educators to profess that the study a foreign language (usually English) was taking precedence over all other courses and that some of China's best universities were becoming "study-abroad prep schools." The complaints of the authorities seemed to have little effect on students intent on getting into an American institution of higher education. And once accepted, their primary anxiety was not a passport from China's security people, as one might expect, but a visa from the American Embassy or from one of the consulates. There is a widespread belief that every year U.S. visas are getting more difficult to obtain. There are, in fact, more rejections, but only because the number of applicants for visas has been growing. The total number of visas issued has not decreased.[12]

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[11] Pierre Perrolle, "After Tiananmen: Science Relations with China," *Issues in Science and Technology*, Winter, 1989-90, p. 54.

[12] The process of obtaining a U.S. visa is considered to be a nerve-racking experience and is dreaded by all. In a biting and somewhat exaggerated description of this "humiliating" process,

Continued

In 10 short years, students and scholars from China became the largest contingent of foreigners on American campuses. As with their predecessors who came to the United States in the first half of this century, the new generation of Chinese students quickly impressed the academic community with their seriousness of purpose, dedication, and appealing manners. Appreciation of these qualities and the novelty of having students from the PRC in American universities bolstered the recognition of the importance of academic exchanges in opening relations with China, and created what many consider an unprecedented amount of goodwill in and beyond the academic community.

Inevitably, after living in the United States for several years, students went through a major transformation collectively and as individuals—as much because of what they learned about this country as by their new-found ability to look at their own country more objectively. It is not really surprising that many of them got spoiled by the special attention shown them and soon learned to take shortcuts and to seek special considerations from the academic institutions and favors from their friends and acquaintances.[13] Neither is it suprising that these bright and affable youths quickly learned how our system works, how to push the right buttons and how to use the "back door." This change was clearly visible in their activites following the Tiananmen incident.

We can only imagine what went on in the minds and hearts of the Chinese students and scholars watching the events in Tiananmen Square from across the ocean. All of them, no doubt, felt grief, concern for their families and friends, and frustration over their own helplessness; for many, the military crackdown affirmed the resolve to remain in this country. Beijing's never-ending assurances that there will be no reprisals for participating in demonstrations fell on deaf ears and, so far, probably no more than 100 students and scholars have returned to China since June 1989. Most are convinced (without any real evidence) that the government has compiled lists of demonstrators and speech-makers in the United States and that to return is to end up in jail.

Thus, the primary concern of the overwhelming proportion of students and scholars now in the United Satates is to complete their education and, at least for the time being, find a way to remain in this country. Funding was not a problem and according to a survey taken by the Institute of International Education and coordinated by Carol Strevy, there was little change in the circumstances of Chinese students who resumed their studies in the fall of

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a Shanghai reporter wrote of the long lines, the "indescribably melancholy" atmosphere inside the Shanghai consulate, the questions that are asked and often not understood, and the need to prove to the "unsympathetic visa-issuing officer" sitting behind "iron bars" that the desire for a student visa is to study and not to use it as a means of getting into and staying in the United States.(Zhou Jiajun,"Shanghai Residents Under the Stars and Stripes Banner," *Jiefang Ribao*, Nov. 17, 1988; FBIS-CHI-88-226, p. 8.

[13] The following example expresses one of the many frustrations experienced by foreign student advisors: "My staff is exhausted, frustrated, angry, resentful, etc. when it comes to Chinese. We spend an inordinate amount of time in dealing with Chinese students and scholars (both in the admission process and once they arrive) and I feel we do things for (with?) the Chinese that we would never do for other nationalities. . . . " (From an informal survey of foreign student advisors conducted in 1988 by Becky Roach, then a foreign student advisor herself, at Iowa State University. I am indebted to Bernard La Berge for providing me with a copy of the survey.

1989.[14] As in earlier years, U.S. academic institutions continued to provide most of the financial support for Chinese students and scholars—most of it secured prior to June 1989—so that students rarely experienced any serious financial problems. Assistance from national donor organizations also continued with few interruptions and some emergency support to students was made available at the local level. But while students were as well off financially after Tiananmen as they were before, the worry about their visas has become a continuing obsession: whether and how to extend it, how to change status, how to make sure none of the available options are overlooked.

Once their studies are completed, work opportunities for Chinese graduates vary greatly. For the most part, those majoring in fields of science and engineering are in great demand in the United States and should have a relatively easy time of finding employment within the academic community or in the economy at large. Moreover, English language competence is not as vital a factor as it is likely to be in other fields. Conversely, opportunities in the social sciences are limited by demand and usually require a standard of language proficiency which many foreign students, whatever their country of origin, find it difficult to attain.

While most Chinese students and scholars resumed their academic work in the fall of 1989, others found an alternative commitment in student protest activities which mushroomed after June 4. Dissident organizations grew, multiplied, and, for a time, seemed to speak for the vast majority of the students. Their goals were imprecise, but what tied them together was a desire to get rid of the current leadership and bring some undefined form of "democracy" to China. To achieve their aims these organizations focused on disseminating information through a sophisticated communications network, providing speakers to address public gatherings, and attempting to lobby Congress on a variety of subjects, ranging from censure of Chinese treatment of imprisoned Tiananmen demonstrators to the issue of renewing the U.S. most favored nation trade status for China in 1990.

Initially, the dissidents experienced no serious problems in raising funds for their activities and publications. Donations were received from the American public, particularly Chinese Americans, and from overseas Chinese communities, especially Taiwan—a sensitive topic for many of the organizations. By 1990 the influence of dissident organizations began to wane and fund-raising became much more difficult. In part, the slowing of activities was due simply to the passage of time and the students' preoccupation with studies and research. Some students, moreover, got fed up with the movement's harshly antagonistic stance toward Beijing that demonstrated little concern for or influence on the developments in China. The most important reason, however, for the dwindling support of the dissident organizations were stories in U.S. newspapers, both in English and Chinese, about "fiscal mismanagement, crippling factionalism and lavish lifestyles in the dissident community."[15] The most dramatic case in point was the rise and fall of Wu'er Kaixi, the brash young "revolutionary" who became familiar to TV viewers during the demonstrations in Beijing, came to the United States to lecture to the American people about the importance of introducing democracy into China, and eventually stumbled from the pinnacle of public approval on the familiar rocks of wine, women and song. Talk of merging some of the organizations for greater effectiveness was grounded on yet another familiar obstacle: the unwillingness of individuals to give up or share their leadership positions.

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[14] *Financial Status of Students/Scholars from the People's Republic of China in U.S.*, (Institute of International Education: New York, February 1990).

V. A PERSONAL PERSPECTIVE

As someone who has followed Chinese student issues for many years, I would like to stray from the more academic format and end this paper not with a summary/conclusion, but with some personal observations which, because they are at variance with majority opinion, can only be expressed in the unbecoming first-person-singular mode. I would also like to express the hope that more than a year after Tiananmen, passions have cooled and my views will no longer be regarded as "genuinely nauseating," to use the words of one respondent to an article I published in July 1989.[16]

Most Chinese students, whether here or in China, are members of the "me generation" that matured under Deng Xiaoping's reforms. This generation views patriotic dedication and sacrifice as "corny" notions, and with the tacit approval of the leadership, has come to appreciate the power of the all-mighty dollar (or yuan, as the case may be). Spoiled by their parents, who vowed that their children would not have to suffer as they did during the Cultural Revolution, these young people could not and did not appreciate the great economic and political progress that China has made in the last decade. Their dreams have much more to do with their own future than with the future of China. This is not a criticism but simply a recognition that Chinese students may be different from the preceding generations, but are no different from many other students around the world. In the meantime, in the minds of many Americans, the image of Chinese students as self-sacrificing martyrs fighting to liberate the Chinese people from the communist dragon in order to bring democracy to the country is fading, but not entirely gone.

Most of the privately funded students who originally came to the United States on F-1 visas, and therefore had an opportunity to change their status in order to remain here, never intended to return to China, and few did. Most of the government-supported students and scholars who came here on the J-1 visa knew they had to return to China, but some, no doubt, secretly wondered if they might eventually find a way to remain in the United States. It seems safe to presume that their proportion kept increasing with the number of years they spent on an American campus. What happened in Tiananmen was a tragedy for all of them, but it also presented an unusual opportunity for those seeking ways to stay.

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[15] See, for example, *U.S. News and World Report*, April 30, 1990, p. 34.

[16] "Students Bear Much of the Responsibility for the Tragedy in China," *Chronicle of Higher Education*, July 19, 1989, p. A36. The unfortunate title was provided by the editors.

They knew that the United States would not force them to go back and President Bush and the Congress quickly confirmed their convictions.

As a group, students and scholars who might return at this time would be no better and no worse off than the rest of the intellectuals in China—not an incentive, to say the least. Except for a few highly visible and vocal leaders, there is no reason to believe that they will be in any way abused. To assume otherwise is to assume that Beijing has lost all hope of getting them back—which is not the case. Conversely, to insist that the life of a student would be in danger if he or she returned to China provides excellent insurance against being forced to return.[17] Chinese students have also learned that the words "human rights" can work magic in the United States. No matter that the Western concept of human rights may not yet be applicable to China's very different social, cultural, and religious traditions and environment. No matter that if asked about human rights and free elections for Chinese peasants or, God forbid, the people of Tibet, most students would likely respond with a blank stare of incredulity.

As discussed earlier, even prior to Tiananmen, students' reluctance to return to China after completing their advanced degree programs was due as much to professional concerns as to political or economic considerations. Most Chinese students in science and engineering, especially those who have earned their PhDs, are over-qualified for China's current needs. With best intentions, China could not provide them with the type of facilities, equipment, and challenges that they have here.

The key question, then, is: How vital are the scholars who are now in the United States to China's economy? Both here and in China one frequently hears that China "desperately" needs the scholars who have been trained abroad. I belong to a small minority of observers who don't believe that at this time the loss of U.S.-trained PhDs creates a "desperate" situation for China—although, it *is* a painful loss of face. Briefly stated, all the institutes of the Chinese academies of sciences, agriculture, and medicine, which are located in major cities, as well as the teaching positions in key comprehensive universities are already fully staffed with highly competent individuals, most of whom were either trained abroad or have had some research experience abroad. This may not be the case in some of the academy branches in the more distant provinces, but because they would be less likely to have up-to-date facilities and equipment for research, sending returning scholars there would be both coercive and a waste of their talents. Using them at a different level or in other capacities would also mean sacrificing years of education and experience gained in the United States. Even if China were able and willing to make additional investments in basic research in order to provide the type of facilities that would attract foreign-trained PhDs, the question would remain whether, given the level of economic development and more immediate priorities, such expenditures could be justified. There is undoubtedly a need for top-notch scientists and engineers in many less prominent institutions of higher education and in industry, transportation, communications, and a host of other fields, but again, allowing for some individual exceptions and special situations, Chinese scholars with foreign experience would not find these positions attractive. This was exactly the complaint leveled at highly-trained scientists by Mao: the country needs them on the production line, so to speak, while they want to do basic research and, to use Mao's words, work in an "ivory tower."

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[17] See, for example, Li Lu, "In China, I'd Be Dead," *New York Times*, Dec. 24, 1989.

Recognizing that China's higher education is extremely uneven and that it is built on, what one observer referred to as, "an illiterate and barren wasteland," it must still be admitted that in the past ten years Chinese universities have expanded and greatly improved their capacity to train middle and high level personnel. There has also been a rapid expansion of graduate education which, since 1983, trained well over 3,000 PhDs, most of them in the physical sciences and engineering. Although the politically suspect social sciences and humanities continue to suffer from Beijing's insecurities, recent visitors report that in many fields the climate is, once again, improving. Thus, I believe that the two million or so people enrolled in various types of institutions of higher education should, for the most part, meet the diverse needs of China's economy. Of course there are still shortages in some fields—no doubt an aspect of fluctuating educational policies and the impossible task of planning enrollment—but scholars currently abroad are not likely to fill these gaps.

Over the past few years Chinese students and their organizations have played a significant role in influencing U.S. relations with the People's Republic of China. But while their input is entirely legitimate and, in some cases, useful, it is well to keep in mind that their goals are not necessarily those of the United States. Another point to remember is that although Chinese scholars have been filling important slots in our universities, in industrial research, and in other capacities, it is in the interest of both the United States and China for them to eventually return home. Tiananmen delayed this process, but I am sure that as conditions improve in China many of them will do just that. And when they do return, they will make a vital contribution not only to China's development but to a better understanding between our two countries.

D. Military

OVERVIEW

By Richard F Kaufman *

Through most of the 1980s, China's military program was given the lowest priority, in terms of resource allocations, of the major sectors scheduled for modernization: Agriculture, Industry, Science and Technology, and the Military. Defense budgets were cut; the size of the army was reduced; and the replacement and upgrading of weapons lagged. Now that is changing. Military strategy has been altered; policies concerning roles, missions, and force structure are being modified; and defense budgets are being increased.

As Paul H.B. Godwin shows, Chinese military policy will be much different in the 1990s. Military strategy underwent a fundamental shift in the mid 1980s from a focus on a general war with the Soviet Union to concerns about small-scale or local wars around China's periphery. In large part, this was the result of Beijing's assessment of a change in the global balance of power away from the bipolar dominance of the two superpowers, toward greater multipolarity. The decline of the Soviet military threat under Gorbachev confirmed this assessment. In the future rising economic strength in Japan, Europe, and some less developed countries, Chinese analysts believe, will be accompanied by growing military strength in those quarters. Military threats could come from a number of sources.

The change in strategy caused the military to be more aware of its shortcomings. Limited war contingencies require a credible capacity for quick response, with a high degree of mobility and command and control. China is weak in these areas and in military hardware and technology generally: "Chinese equipment is not on a par with advanced Western systems—it may not even be close." In addition, the possibility of a major war cannot be ruled out. But the task of modernizing the military establishment to achieve competence at all levels of warfare will be time consuming and expensive.

The paper by Robert Skebo, Gregory Man, and George Stevens discusses China's military capabilities and the obstacles to modernization. Combat capabilities have steadily declined relative to the Soviet Union and even some of its smaller neighbors. Nevertheless, China still retains considerable military power. Its nuclear forces are roughly equivalent to those of France, with long-range missiles

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that can launch space satellites and probably strike targets throughout the United States. Its bomber and undersea forces are mostly medium- or short-range and outmoded. China's large ground forces are capable of defense but have only limited ability to project power. There is a lack of logistical support, transport, air defense, communications, armor, and air support.

The navy is slowly expanding its coastal defense force to develop regional power projection capabilities. But its surface fleet and submarines are obsolescent. It has a relatively large number of destroyers and frigates, modest amphibious capabilities, and diesel submarines designed in the 1950s. Naval aviation is severely limited. The Air Force faces similar problems of aging and obsolescence.

Modernization is constrained by three types of factors: economic, technological, and political-social. Rapid replacement is not possible because of costs. The leadership is aware that defense is an economic burden, and limited budgets and the need to support the large number of forces are likely to hold back new weapons development and production. Limited access to advanced Western technology continues to hamper efforts to improve manufacturing techniques and management in the Soviet designed defense industrial base. Added to these problems are a controversy over the proper amount of political indoctrination to be included along with professional training, the negative effects on morals and efficiency of a variety of corrupt practices, and the failure of the military to attract high calibre recruits.

The trends in defense spending, examined by James Harris and other analysts of the Central Intelligence Agency, reflect the changes in strategy and policy as well as more recent events. The decline in defense spending was reversed in 1990 when it was announced that the defense budget had been increased. Depending upon estimates for inflation, the real increase could be about 10 percent. The share of GNP spend for defense is estimated at 3.5 percent.

While there are growing pressures for weapons modernization, most of the increased allocations will be used to address problems related to domestic security and military morale. On the assumption that there are no immediate external threats, and in the wake of the Tiananmen crisis of 1989, resources are being channelled to the stationing of troops in the Beijing area, increasing internal security throughout the country, maintaining equipment, constructing barracks and other facilities, increasing food supplies, and ensuring adequate military pay and retirement.

The military leadership anticipates intensified arms races in the Asian-Pacific region, a resurgent Japan, and potential challenges from Taiwan and India, among other regional powers. Such concerns form the basis of current efforts and military demands for increased resources to replace and modernize the inventory of nuclear and conventional weapons, and to accelerate long-term research and development. Military spending is likely to continue rising over the next several years.

The complicated role played by the military establishment in China's political economy is discussed by Ronald N. Montaperto. Historically, the distinction between civilian and military leaders has been blurred, and a symbiotic relationship between the two developed. The senior military leaders have enjoyed a high degree of access to and influence over their civilian counterparts which has allowed them to be deeply involved in the political succession and many broad policy issues.

This interaction is changing as the old leadership passes from the scene and as personal relationships are replaced by institutional structures and arrangements. A new military professionalism has given rise to leaders and constituencies whose career advancement is based on specialized knowledge and expertise and who define their political interests in ways that elicit from the system the resources necessary to modernize the military. The technocrats, for example, are a group of officers educated as scientists and engineers rather than as professional soldiers. They are interested in acquiring advanced foreign technologies and in coordinating the research and acquisition plans of the military services. They also appear to advocate foreign military arms sales, much of which are conducted by military run enterprises.

Shirley Kan provides an account of China's emergence as a major arms supplier in international markets, and the consequences for China and the world. Chinese weapons have been sold exclusively to developing countries and deliveries soared in the latter part of the 1980s. In the Iran-Iraq war sales totaling $7.5 billion were made to both sides. China became the fifth largest arms merchant selling weapons to developing countries during this period, behind the Soviet Union, the United States, France, and the United Kingdom.

Arms exports play an important role in military modernization by promoting technical progress, through contacts with foreign experts, and through the infusion of foreign exchange earnings. The profits from arms sales are an important source of revenue for the military. This activity also furthers some of the objectives of industrial reform by encouraging industrial decentralization and the spread of profit-oriented commercial sectors.

China has been accused of reckless conduct in arms transfers, but its decision to discontinue sales to Iraq following that country's invasion of Kuwait placated many Western critics. In the 1990s, Kan concludes, China can be expected to continue a vigorous program of arms sales to advance its position as a world power and to earn hard currency.

CHINESE DEFENSE POLICY AND MILITARY STRATEGY IN THE 1990s

By Paul H.B. Godwin *

CONTENTS

Page

Summary 648

I. Military Strategy and Security 649

  China's Perceived Security Environment 650

II. Defense Policy and Military Strategy 652

  Local War and the Military Region 654

  Command and Control in Small-Scale Wars 657

III. Military Technology and Small-Scale Wars: The PLA's Continuing Dilemma 658

IV. Local War and Total War: Linkages across the Spectrum of Conflict 660

  Nuclear Weapons and Local War 660

V. Conclusions: Chinese Defense Policy in the 1990s 662

SUMMARY

China's interpretation of the changes in the international security environment from a condition where the United States and the Soviet Union dominated a bipolar world to one where the trend is increased multipolarity has been reflected in its defense policy and military strategy. In 1985, the Chinese People's Liberation Army (PLA), as all three services are collectively known, was required to redirect its development of military strategy from a myopic focus on general war with the U.S.S.R. to the more probable source of military conflict: small-scale and potentially intense wars around China's periphery. New enemies did not emerge; rather, the kinds of conflicts that could arise required a fresh look at defense policy and military strategy.

Over the past five years, even as the military threat from the U.S.S.R. diminished, the Chinese armed forces developed new defense strategies and concepts of operations to support these strategies. The eleven military regions (MR) within which all Chinese forces are deployed were reduced to seven, with each MR seen as a potential theater of operations. The ground forces were reorganized into Group Armies and their training focused on the development of quick-reaction capabilities in combined arms packages utilizing all branches of the armed forces. The MR commander became, in

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essence, the commander of a unified theater of command responsible for a theater of war or "war zone."

These changes, although important in themselves, left the PLA even more conscious of its technological obsolescence. Developing concepts of military operations in which speed and lethality were to be the principal characteristics of combat, rather than defensive operations based upon attrition warfare and a society mobilized for war, served only to highlight one of the PLA's primary weaknesses. As in all the years since the beginning of Chinese defense modernization in the late 1970s, these technological weaknesses led the armed forces to demand swifter modernization of their arms and equipment.

Even with these limitations, however, the new paradigm of war reflected in the PLA's military exercises will do little to alleviate the apprehensions of China's smaller neighbors. Beijing states that its defense policy *is* defensive. Nonetheless, the military strategy and operations developed in support of this policy contain concepts and capabilities with offensive elements. These offensive elements are currently severely limited by the inability to provide the logistic support for force projection much beyond China's border. The decade of the 1990s could see this change.

I. MILITARY STRATEGY AND SECURITY

In the spring of 1985, the Military Commission of the Central Committee of the Communist Party of China (*Zhongyang Junshi Weiyuanhui*—CMC) ordered a critical change in the strategic guidance directing the Chinese People's Liberation Army (PLA) military strategy and training. The new guidance directed the armed forces to refocus their strategy formulation and operational training from preparation for an "early, major, and nuclear war" to what the CMC declared the most likely form of conflict in the foreseeable future—local limited war (*jubu zhanzheng*) around China's borders.[1] This CMC decision remains the authoritative guidance for Chinese defense policy and military strategy five years later.

The Central Military Commission, until recently chaired by Deng Xiaoping, is the highest level of authority in the Chinese defense establishment. The Ministry of National Defense functions primarily as the CMC's administrative arm. Although the precise manner in which the CMC contributes to security and defense policy decisions is not known, its membership indicates the weight it carries in policymaking. The 14 members in 1985 included the defense minister, the PLA chief of staff, and the directors of the PLA General Logistics and Political Departments. They were accompanied by China's three surviving marshals serving Deng Xiaoping as his vice chairmen. With Deng as chairman of the commission, it is reasonable to assume that the views of China's leading soldiers were heard and carried great weight in decisions influencing security and defense policy.[2]

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[1] See Generals Zhang Zhen and Li Desheng's discussion of the May–June 1985 Military Commission's guidance at a meeting with the editorial board of *Jiefangjun Bao* (Liberation army daily) reported in *Ta Kung Bao* (Hong Kong), 16 February 1986, in *Foreign Broadcast Information Service: People's Republic of China* (hereafter FBIS–CHI), No. 032 (18 February 1986), pp. W11-12.

CHINA'S PERCEIVED SECURITY ENVIRONMENT

The threat perceptions of China's leadership changed dramatically over the years 1978-1985. The Third Plenum of the Eleventh Central Committee, meeting in December 1978 under Deng Xiaoping's predominant influence, concluded that the Soviet Union was not an *immediate* military threat to China's security. Although not an immediate threat, the U.S.S.R.'s aggressive foreign policy was seen as threatening China over the long-term, and Soviet military forces deployed along the Sino-Soviet border were seen as the most direct military threat to China's security. Defending against a massive Soviet assault deep into the political and industrial heart of China was the principal objective of the military strategy and concepts of operations developed by the PLA over the years 1978-1985.[3]

The "strategic shift" directed by the 1985 CMC meeting came shortly after Gorbachev became the general secretary of the Communist party of the Soviet Union (CPSU), but more than a year prior to his July 1986 speech in Vladivostok. Thus there is no connection between Gorbachev's implementation of a more conciliatory policy toward China and the change in China's threat perceptions. Far more relevant was Beijing's assessment that there had been a shift in the global balance of power over the years 1978-1985. By the early 1980s, Chinese journals specializing in international security affairs were concluding that the Reagan Administration's policies had not only created a shift in the military balance of power, but that there was a new American resolve to oppose Soviet expansionism. They further concluded that a military balance had been created in which the United States had an edge, but that the two superpowers essentially stalemated each other. The superpower stalemate would continue into the 1990s, and perhaps into the twenty-first century, thereby making a world war very unlikely.[4] This same shift in the global balance of power and the superpower stand-off would prevent the Soviet Union from attacking China.

Even as the Reagan Administration was strengthening U.S. military power and was viewed by Beijing as systematically opposing the predatory foreign policy objectives of the U.SS.R., Chinese analysts also saw the international system as undergoing a major change. The long-term dynamics of the international system were perceived as creating a condition in which both the U.S.S.R. and the United States would have decreased influence in the world. Both were viewed as being impoverished by their mutual competition. Their economic decline would reduce the political influence of both superpowers, while the rapidly growing economic strength of Europe, Japan, and a number of Third World economies would grant them greater independence from both Moscow and Washington. Growing military strength would accompany rising economic strength, thereby contributing to what Chinese analysts as early as 1983 saw as an emerging multipolar world.[5]

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[2] The best analysis of this problem is found in A. Doak Barnett, *The Making of Foreign Policy in China: Structure and Process* (Boulder: Westview Press, 1985), especially pp. 96-102.

[3] See Paul H. B. Godwin, "Changing Concepts of Doctrine, Strategy and Operations in the Chinese People's Liberation Army 1978–1987," *The China Quarterly*, No. 112 (December 1987), pp. 578–581; and Ngok Lee, *China's Defense Modernisation and Military Leadership* (Sydney: Australian National University Press, 1989), pp. 146–174.

[4] Banning Garrett and Bonnie Glaser, "From Nixon to Reagan: China's Changing Role in American Strategy," in Kenneth A. Oye, Robert J. Lieber, and Donald Rothchild (eds.), *Eagle Resurgent? The Reagan Era in American Foreign Policy* (Boston: Little, Brown, 1986), p. 283.

Multipolarity was not viewed as necessarily favorable to a tranquil international environment. Rather, whereas the balance of power between the United States and the Soviet Union would not permit either to launch a war against the other, thereby making a global war unlikely, the chances of local wars flaring up was increased by the growing military strength of local and regional powers. The most threatening aspect of the emerging global environment perceived by Chinese analysts was the increased probability of small-scale wars around China's periphery.[6]

The 1985 decision of the CCP Central Military Commission to shift the PLA's war preparation and training toward a primary focus on potential small-scale wars fits the pattern of global power evaluations and threat assessments presented by China's leading journals of international affairs for some years. Because independent research centers do not exist in China, it is reasonable to assume that these journals reflect basic strategic questions postulated at the highest levels of China's decision-making process. Further, when a consensus emerges in these journals, it can be assumed that such agreement reflects the general pattern of strategic analysis held by China's security policy elite.

The "normalization" of Sino-Soviet relations in May 1989, went far toward reducing Chinese perceptions of the Soviet threat even further. The progress made in Soviet force reductions in the Mongolian People's Republic was complemented by direct discussion with Moscow of confidence and security-building measures along the Sino-Soviet border.[7] Although not openly stated by Chinese analysts, the economic problems faced by the USSR and the reductions in Soviet defense spending would also reinforce their sense of confidence that the Soviet military threat was quickly dissipating.

Nonetheless, analyses of Soviet military strategy in January and March of 1990, while noting force reductions in Europe and Asia and the shift toward a defensive military doctrine announced by Gorbachev, adopted very cautious and conservative positions. They stressed that Soviet forces were in *transition* to a more defensive military doctrine and force structure and that, in the words of the official newspaper of the PLA, *Jiefangjun Bao* (Liberation army daily), "At the same time it must be made clear that the Soviet Army presently remains an offensive force; even if the change to a "defensive structure" is realized in the future, the Soviet Army will still carry tremendous potential of launching in-depth attacks." [8] Nor was such a cautious interpretation limited to military journals. *Shijie Zhishi* (World knowledge), a journal focused on issues of international politics and security studies, was similarly cautious about any near-term change in Soviet military strategy. While recognizing that Soviet forces were going to be cut by some 500,000 and that a reduction in strategic nuclear forces would occur, a January 1990 essay stressed that these reductions were balanced by the technological upgrading of Soviet weapons and equipment, including space systems. The author concluded that "the forward-deployed offensive posture of the Soviet Union has not been fundamentally changed." [9]

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[5] Xing Shugang, Li Yunhua, and Liu Yingna, "Soviet-American Balance of Power and Its Impact on the World Situation in the 1980s," *Guoji Wenti Yanjiu*, No. 1 (January 1983), in FBIS–CHI, No. 028 (21 April 1983), pp. A1–12.

[6] Zong He, "Changes and Developmental Trends in the International Situation," *Shijie Zhishi*, No. 11 (1 June 1983), in FBIS–CHI, No. 141 (21 July 1983), pp. A1–5.

[7] See the Agence France Presse (AFP) Hong Kong report, 27 January 1990, in FBIS-CHI, No. 124 (27 June 1990), p. 3; and Foreign Minister Shevardnadze's interview with A. Bovin on Moscow Television Service reported in FBIS–SOV, No. 180 (17 September 1990), pp. 13–14.

This cautious interpretation of changes in Soviet military capabilities and strategy brings into focus an important aspect of Chinese evaluations of their security environment. Whereas multipolarity is the predominant *trend* in the dynamics of the international system, the military strengths of the U.S.S.R. and the United States will continue to give them an important role in international politics for some time to come.[10] Furthermore, the security policies of the U.S.S.R. and the United States remain the most significant forces for change in the immediate future. Their current policies of dètente and dialogue with each other, although driven by their own internal weaknesses, are seen by Chinese analysts as the major contributor to the present international environment.

The security environment perceived by Chinese analysts for the 1990s is therefore one in which the trend toward multipolarity will continue as the influence of the U.S.S.R. and the United States continues to lessen. There is no world conflict threatening the international system, but in the words of the Chinese foreign minister, "the 1990s will witness fierce turbulence and recurring struggles in the general course of dètente and dialogue." [11] It is this turbulence and unpredictability that, for Chinese analysts, creates the possibility of conflict around China's periphery. The multipolar world perceived by China's analysts is created by the decreasing influence of the superpowers and the growing political, economic and military strength of regional powers. Thus there is within Chinese analyses, especially their military appraisals, growing sense of China's vulnerability within an increasingly unpredictable global security system.

II. DEFENSE POLICY AND MILITARY STRATEGY

With the CMC's new strategic guidance in 1985, Chinese military strategists were tasked with preparing the PLA primarily for small-scale limited conflict. While the U.S.S.R. remained the only state capable of launching a major war with China, the chances of such a conflict were minimal at best. The U.S.S.R.'s primary protaganist remained the United States, and the principal focus of this confrontation remained in Europe. With the superpowers militarily stalemating each other, and with the United States sustaining a military edge in Europe and the Pacific, the possibility of a major military confrontation with the Soviet Union was small. What China now faced as it looked to the future was the possibility of small wars erupting along its borders—including the remote possibility of a limited war with the Soviet Union. These wars required a distinctly different preparation from the principles of protraction and attrition that had dominated the armed forces' preparations for war with the U.S.S.R.

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[8] Wang Haiyun and Zhou Yi, "New Trends in Soviet Army's Theoretical Study of Combat," *Jiefangjun Bao*, 23 March 1990, in FBIS-CHI, No. 075 (18 April 1990), p. 9.

[9] Zhou Aiqun, "The Soviet Union Adjusts Its Military Strategy," *Shijie Zhishi*, No. 2 (16 January 1990), in JPRS-China Report, No. 037 (14 May 1990), p. 6.

[10] Wang Lin, "Looking Towards the 1990s," *Beijing Review*, No. 1 (1-7 January 1990), p.12.

[11] "Foreign Minister Qian Qichen Answers Questions Raised by *Shijie Zhishi* on Current International Situation on 20 December 1989," *Shijie Zhishi*, No. 1 (1 January 1990), in FBIS-CHI, No. 022 (1 February 1990), p. 2.

Chinese analysts view "local wars and limited wars" as a category of conflict circumscribed both in geographical scope and political objectives, but as a type of war that can vary widely in intensity and duration. They state that the purpose of military force when used in these wars is not to totally eliminate the adversary's capability and will to resist, but to "assert one's own standpoint and will through limited military action, . . This being the case, the further progression of modern limited warfare is mainly not decided through military action as such, but rather determined by the needs in the political and diplomatic struggle." [12] While recognizing that these kinds of wars can be quite lengthy in duration, such as the Korean war, the American war with Vietnam, and the Iran-Iraq war, the primary focus of Chinese military analyses has been on the operational requirements for localized wars of short duration.

Chinese military journals have designated five types of limited war to be of special importance:

1) Small-scale conflicts restricted to contested border territory.

2) Conflict over territorial seas and islands.

3) Surprise air attacks.

4) Defense against deliberately limited attacks into Chinese territory.

5. "Punitive counterattacks" launched by China into enemy territory to "oppose invasion, protect sovereignty, or to uphold justice and dispel threats." [13] The characteristics common to all of these scenarios are the limited political objective behind the use of military coercion and the requirement that the forces used be able to respond quickly to either defeat the presumed political purpose of the attack, or gain the political objective sought by the limited use of force.

Nonetheless, the new focus of the PLA's military training, both in the field and within China's centers of professional military education, did not exclude the Soviet Union. What changed was the nature of a potential conflict with the U.S.S.R., for the Soviet Union was included in the PLA's new concentration on local and limited wars that potentially endangered China's periphery. The kinds of conflicts most likely to be fought required a new look at defense policy and military strategy. As one essayist noted in 1986, preparation for a world war while neglecting local war "will lead to dangerous strategic planning and erroneous macro-policymaking." [14]

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[12] Jiao Wu and Xiao Hui, "Modern Limited War Calls for Reform of Traditional Military Principles," *Guofang Daxue Xuebao*, No. 11 (1 November 1987), in JPRS–China, No. 037 (12 July 1988), p. 49.

[13] Jia Wenxian, Zheng Shouqi, Guo Weimin, and Long Zhuoqun," "Tentative Discussion of the Special Principles of a Future Chinese Limited War," *Guofang Daxue Xuebao*, No. 11 (11 November 1987), in JPRS–China, No. 37 (12 July 1988), p. 48, contains this particular categorization, but over the past three years a number of essays in a variety of journals have tended to focus on these types of potential conflicts.

There is a strange ahistorical cast to Chinese analyses of limited, local war appearing in military journals over the years following the CMC's decision. Although most of the essays recognized the importance of the Korean war and China's 1979 incursion into Vietnam within their analyses of the different kinds of limited war and local conflicts that had occurred since the conclusion of World War II, they did not note that all of the conflicts fought by the Chinese armed forces since 1949 fall into this category. From the Korean war in 1950 to the March 1988 seizure of atolls in the Nansha (Spratly) Islands, Chinese armed forces have been used in precisely the kinds of confrontations the CMC concluded would be the most likely form of military conflict for the foreseeable future.

Since the summer of 1985, there has been a continuing series of exploratory essays analyzing the operational requirements of small-scale wars. Local wars and unanticipated military crises involving only limited political objectives require the swift and effective application of military force. This characteristic demanded a major reorientation of the armed forces' approach to military strategy and operations. As a *Liberation Army Daily* article defined the situation at the end of 1989, "the main task of our Army is to deal with sudden incidents or limited wars." [15]

Within this framework, the issue of a three-stage approach to campaigns, where the war is divided into defensive, stalemate, and counteroffensive stages or phases, has been questioned for local war in much the same manner as it was when Chinese military strategists were preparing for a major war with the Soviet Union. In essence, Chinese analysts now state that modern military technology grants an aggressor the capability to seize the initiative in the opening battles of the war—that the first battle will be of crucial importance in local wars. This means that mobilizing the entire country and people for war is no longer an appropriate policy.[16] The nature of contemporary and future warfare requires standing forces capable of quick and lethal response to crises involving the threat or application of military force. This operational need resulted in considerable discussion both of the weaknesses in China's military technology and the preparation of its armed forces for war.

LOCAL WAR AND THE MILITARY REGION

Preparation for local wars required the PLA to review its defense posture around the periphery of China and make an assessment of the most likely conflicts to be fought in each sector. Given the diversity of terrain, weather, and potential adversaries, different border regions were faced with distinctly different operational requirements. This led to the conclusion that each of China's seven military regions (MR) should conduct independent training and field exercises for local war.[17] The concept of "war zone" was introduced, with the observation that "war zone independent campaign operations will probably be the most frequently seen mode of action in the Army's campaign operations for some time to come." [18]

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[14] Zhang Qinsheng, Liang Hunan and Yan Xiaonin, " A Study of Local War Theory," *Liaowang* (Outlook—Overseas edition, Hong Kong), No. 37 (15 September 1986), in FBIS-CHI, No. 183 (23 September 1986), p.K5.

[15] Chen Yutian, "Pay Attention to Forecasts of 'Small Wars,' " *Jiefangjun Bao*, 29 December 1989, in JPRS-China, No.011 (12 February 1990), p. 65.

[16] Ibid.

1988 saw four major regional exercises conducted under the direction of their MR commanders. These exercises were designed to test the extent to which the previous three years of preparation had developed new capabilities within the armed forces to respond to the changing nature of warfare. Three of the exercises focused on the U.S.S.R. as the potential adversary: West-88, conducted by the Lanzhou Military Region in northwestern China; Yanhang-88, conducted by the Beijing MR in northern China; and Qianjin-88, conducted by the Shenyang MR in the northeast. Guangzi-15, conducted by the Guangzhou Military Region in the South China Sea, where the postulated enemy had to be Vietnam, rounded out exercises.[19] The only potential adversaries not faced in these campaign-level maneuvers were India and Taiwan, and there has been no reporting of exercises on the Sino-Indian border or near Taiwan equivalent to those directed at the U.S.S.R. and Vietnam.

The capabilities tested were primarily rapid deployment and combined arms operations responding to "border clashes, accidents, and local warfare." [20] Equally important, however, was the principle that the exercises should test theater operations fought by individual military region commanders as independent campaigns. In each of these exercises, the MR commander was clearly defined as being responsible for the campaign and, presumably, the concept of operations behind the campaign.[21] The three exercises directed against a Soviet attack focused on the ability of the Chinese armed forces to respond quickly to a "blitzkrieg" assault. There was no reference to a massive mobilization of the society at large. They were not exercises designed to test the PLA's ability to conduct a prolonged defensive war, but rather campaigns built around combined arms warfare to disrupt and eject Soviet forces as early in the confrontation as possible. The exercises reflected Beijing's concern that a Soviet attack on China could be conducted for immediate political objectives rather than a war to subdue and conquer China itself. For example, when China attacked Vietnam in 1979, the U.S.S.R. could have considered a limited assault on the PRC to force Beijing to back down from the invasion and withdraw its forces from Vietnam.

The importance of these exercises was demonstrated by the presence of the Chief of the General Staff, General Chi Haotian, and the President of the PLA National Defense University (PLA/NDU),

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[17] Zhao Tianxiang, "Militia Reform and the Strategy of Theater Development," *Jiefangjun Bao*, 10 June 1988, in JPRS-China Report, No. 069 (4 November 1988), pp.29-30.

[18] Xu Jingyao, "1988: A Year of Reform for the Chinese Army," *Liaowang* (Overseas edition, Hong Kong)No. 3 (16 January 1989), in FBIS-CHI, No. 014 (24 January 1989), p.36.

[19] Ibid., p. 37.

[20] Ibid., p.36.

[21] Beijing Domestic Service, 14 October 1988, in FBIS-CHI, No.202 (19 October 1988), p.29.

General Zhang Zhen, as observers in the West-88 exercise.[22] The PLA/NDU is deeply involved in preparing analytic studies of the requirements for small wars, and its students at the Group Army and military region command-levels have undertaken courses and analytic studies of local war requirements. These ideas are tested in field and command post exercises undertaken when the officers return to their MR commands.

Guangzi-15, conducted by the Guangzhou MR in the South China Sea, was designed to test the PLA's ability in both coastal defense and the protection of China's territory in the South China Sea. It was a combined arms campaign like those in the north, but was rendered more complex by the need to coordinate land, air, and naval forces, including the naval air arm, in a force projection exercise. It should be noted that the PLA's brigade-sized Marine Corps is deployed in the Guangzhou MR on the island of Hainan, where it is trained specifically for force projection into the South China sea. Once again, the importance of this exercise can be seen in the presence of Lieutenant General Han Huaizhi, a deputy chief of the General Staff Department (GSD), together with representatives of the GSD Training Department and observers from the PLA/NDU and the PLA's Academy of Military Science (AMS).[23]

The exercises all referred to the use of "special forces" as an integral part of the campaigns. Such forces are quite new and have played a prominent role in Chinese analyses of local war requirements. The size of these units is not known, but they are probably small, well-trained combat forces. They are trained to fulfill four major functions in a campaign: as "door openers" striking at critical targets and widening a breach in the enemy's position; as a "scalpel" to strike at targets that, when destroyed, will paralyze the adversary's combat potential; as "steel hammers" to seize crucial enemy positions; and as "boosters" to speed up the tempo of a campaign by opening up new battle areas within the invaded area.[24]

Forces with these roles are often referred to as "fist" (*quantou*) units and have been the focus of considerable discussion in Chinese military journals over the past five years. Air-mobile forces are one focus of Chinese interest, and units of the airborne forces of the PLA have been selected for training as "fist" units and "rapid response units" capable of being deployed anywhere in China within 12 hours.[25] Each military region has been reporting the development of "fist units" and rapid deployment forces designed to fit its own local situation and potential adversary. The PLA Marine Corps has received considerable publicity in these reports. Originally founded in 1953 but disbanded in 1957, the Marine Corps was reestablished on 5 May 1980 as the "fifth arm of the Navy." Headquartered at Zhanjiang, Guangdong—the fleet headquarters of the

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[22] Ibid.

[23] Zhu Dacheng and He Delai, "Guangzhou Military Region Organizes Land, Naval, and Air Force Commanders and Organs to Stage a Joint Exercise," *Jiefangjun Bao*, 8 November 1988; in FBIS-CHI, No. 227 (25 November 1988), p.37.

[24] Li Qianyuan, "A Cursory Analysis of the Characteristics of Limited War of the Future," *Jiefangjun Bao*, 19 December 1986, in JPRS-China, No. 048 (23 September 1987), p.91.

[25] Tan Jun and Hong Heping, "A 'Fist Battalion' of a Certain PLA Airborne Unit," *Jiefangjun Bao*, 14 June 1988, in JPRS-China, No. 045 (9 August 1988), pp.59-60.

South Sea Fleet—the Marines have received special attention as China's amphibious force capable of "sudden landings." [26] Their deployment with the South Sea Fleet and Chinese analyses of the Marines' role in local war clearly identifies them as the "fist" unit for operations in the South China Sea.

COMMAND AND CONTROL IN SMALL-SCALE WARS

Force projection in small-scale wars raised questions about the distinction that Chinese military thought makes between strategy, campaign, and tactics and their implication for command and control during small-scale wars. Normally, these three levels of the military art are viewed as having distinct borderlines. Small wars, some Chinese analysts suggest, blur this traditional distinction as the significance of tactical actions increases. Whereas in major wars tactical actions will have little influence on the "overall war situation," in small wars, tactical actions may achieve strategic objectives. Furthermore, the objective, location, and timing of an action or strike can be so significant that even tactical actions will require a decision by the highest level of command, including the head of state. Thus, those in charge of the strategy for a local war campaign may well have to pass over all intermediate levels of command and communicate directly with the tactical units.[27]

These analysts see three potential command patterns for localized conflicts. In the first, the campaign commander recognizes that on occasion he will be bypassed and therefore accepts the combat order given directly to a subordinate commander and does not interfere with the action itself. In the second, the strategic-level command authority is also in operational command and communicates directly with tactical units. In the third, an independent command is created with specific restrictions placed on the commander's freedom of action.

Within this third pattern of command, the commander can act independently of higher authority. The military objective, forces to be used, geographical constraints, and time of the attack would be strictly delineated, but, within these restrictions, the field commander could act independently without the need to report or request instructions through the chain of command. Chinese analysts note that this type of authority was given to Rear Admiral Woodward as commander of the British task force in the Malvinas (Falklands) campaign. They also note that similar restrictions had been placed on General MacArthur, but when he demonstrated intent to overstep the constraints placed upon his authority, President Truman relieved General MacArthur of his command.[28]

This analysis raised an important issue, for the emphasis in the 1988 exercises was on campaigns fought within a military region under the direction of the MR commander. Yet the logic of small wars, where political objectives are as limited as the conflicts' geographic scope, could result in reducing the campaign commander's freedom of action. The central authorities controlling the political strategy directing the campaign may also be required by the logic of the situation to assume command, or at least direction, of tactical actions because they can have a profound effect on the outcome of the war.[29] By raising the examples of General MacArthur and Rear Admiral Woodward, the analysts were looking at one of the most significant questions raised by small wars—what limits need be placed on a field commander's freedom of action in order to ensure that the combat operations of a campaign do not undermine the political objectives of the war itself?

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[26] Deng Huaxu and Li Daoming, "A visit to the PLA Marine Corps," *Renmin Ribao* (People's Daily), Overseas Edition, 2 August 1988, in FBIS-CHI, No. 149 (3 August 1988), pp.30-31.

[27] Jiao Wu and Xiao Hui, "Modern Limited War" pp.50-51.

[28] Ibid.

Ultimately, of course, this question and most others dealing with command and control in small wars is dependent on the specific setting and objectives of the conflict. Although Chinese analysts agree on the principal characteristics of small wars, they are still investigating the diversity of issues raised by these confrontations.

Chief of Staff Chi Haotian stated the underlying principle of the PLA's approach to local war in a commentary on the 1988 exercises: "Our country has a vast territory and the conditions vary in different parts of the country. Instead of indiscriminate imitation, all Army units should conduct their studies in the light of their different conditions.This should be the basic starting point in our study of local war." [30]The occasion of this speech was a meeting with officers who had participated in the West-88 exercises in northwest China. Each of China's military regions faces different conditions under which it has to conduct operations, even if, as in the case of three MRs facing the U.S.S.R., the potential adversary is the same. Thus the character and operational demands of the campaigns will vary, the force structures employed in combat will differ, "fist" units and other special forces will range in their size and composition, and the intensity of the combat also will vary. This being the case, there can be no common mold directing each MR commander's preparations. Each MR, seen as a potential theater of operations, will develop its own campaign plans in view of its own unique conditions.

Despite this diversity, however, one problem was common among all campaigns. The operational demands of local wars raised once again the difficulties created by the armed forces' backward military technology.

III. Military Technology and Small-Scale Wars: The PLA's Continuing Dilemma

Chinese analyses of the requirements for small-scale wars and unanticipated military crises have paid close attention to the need for a quick, lethal response by China's armed forces. Even if military force is not applied, a credible capacity to quickly respond to a crisis must be available if China is to maintain an effective deterrent posture at this level of warfare. Current levels of Chinese military technology severely limit both the mobility and lethality of the PLA.

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[29] Liu Zhiwei, "A General Forecast of the War Patterns in the 1990s," *Jiefangjun Bao*, 9 February 1990, in FBIS-CHI, No. 041 (1 March 1990), p.34.

[30] Chi Haotian, "Meet the Needs of Military Struggle in the New Period, Constantly Increase the Defense and Combat Capacity of Our Army," *Jiefangjun Bao*, 16 October 1988, in FBIS-CHI, No. 211 (1 November 1988), p. 26.

An example of the quick response tactic, Chinese analysts believe, was the Israeli invasion of Lebanon which was deliberately launched when the eyes of the world were focussed on the war in the Falkland islands. Beirut was under siege in three days, and the operation was completed in five days. In the minds of these analysts, the effect was a *fait accompli* before world opinion had been formed.[31]

The operational requirements for small-scale wars identified by the PLA place great emphasis on the need for mobility and lethality, and for command, control, communications, and intelligence (C3I) capabilities to direct swiftly moving combined arms combat integrating air, land, and naval forces. The PLA's weaknesses in these areas are readily recognized by Chinese analysts, who state that "divorced from advanced military science and technology, we cannot possibly build an army capable of stopping and winning a modern war." [32]

Nonetheless, and despite continual reporting in the Chinese press and journals of the extent to which the PLA is modernizing its combat aircraft, naval combat vessels, armored fighting vehicles, antitank/antiair/antiship missiles, and developing computer-based command and control systems, Chinese equipment is not on a par with advanced Western systems—it may not even be close. Even with the force reduction by 1 million undertaken since 1985, the Chinese armed forces themselves remain very large—perhaps some 3.2 million, with the ground forces accounting for 2.3 million.[33] Added to this are 9,000 main battle tanks (MBT), 2,800 armored personnel carriers (APC), some 7000 fixed-wing combat aircraft (including naval aircraft), 115 submarines (including 1 SSBN and 3 SSNs), and 53 destroyers and frigates as the major naval surface combatants, this is a very large force to bring up to advanced Western standards. Indeed, the task is too large and too expensive to be completed in a short period of time. Once again, this is something the Chinese readily admit and discuss quite openly.

The approach taken by China in recent years has been to modernize selectively. The leadership has chosen to upgrade key units. It appears that the "fist" units, which come in various types and sizes according to the military regions' operational requirements, are those where the most modern equipment is introduced and tested in field exercises.[34] This, the Chinese note, is the practice followed by advanced military forces in the West.[35] While undoubtedly the most sensible way to introduce new weapons and equipment into the armed forces, it will not result in a "modernized"

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[31] Zhang Taiheng, "Local Conflicts and Special Forces," *Jiefangjun Bao*, 14 March 1986, in JPRS–China, No. 055 (3 November 1987), p. 37.

[32] Wang Chenghan, "On Coordinated Development of National Defense and the Economy," *Hong Qi* (Red Flag), No. 17 (1 September 1987), in JPRS–China, No. 11 (7 December 1987), p. 18. This essay in what was until 1989 the Communist party's theoretical journal is but one of many over the past decade stressing that the need to modernize the PLA's military equipment in coordination with its modernization of strategy and operations requires greater defense outlays than Beijing is willing to provide.

[33] These figures and the others used in this section are taken from *The Military Balancen 1988–1989* (London: The International Institute for Strategic Studies, fall 1989).

[34] He Chong, "Let Some Units Modernize First," *Jiefangjun Bao*, 6 November 1987, in JPRS–China, No. 006 (19 February 1988), pp. 85–86.

[35] Dongfang Tie, "What Can We Learn From Other Countries' Practice of Strengthening Key Troops," *Jiefangjun Bao*, 19 March 1988, in FBIS–CHI, No. 66 (6 April 1988), p. 39.

PLA except over a very long period of time. But, as Chinese analysts observe, with the sole exception of the U.S.S.R., the most likely sources of local war around the Chinese periphery do not involve countries whose forces have the capability to fight high-technology warfare in same capacity as the major Western powers.[36] Needless to say, this condition does not satisfy the Chinese military leadership, who continue to press for larger military budgets and the acquisition of advanced military technology. The operational requirements of local wars provide yet another arrow in their quiver of defense budget demands.[37]

IV. LOCAL WAR AND TOTAL WAR: LINKAGES ACROSS THE SPECTRUM OF CONFLICT

Chinese analysts insist that if China wishes to contain a local war within the parameters set by its limited political objectives, the PLA must also have the capability to deter and fight a major war. In presenting this argument, these analysts note that major foreign military powers prepare for major war, small-scale wars, and unexpected crises ("random eventualities") as part of their preparation for all levels of warfare.

Preparation for "total" war is seen as performing two functions: it serves as a deterrent and prepares the armed forces for such a war should it occur. Preparation for a major conflict also complements readiness for small-scale wars. The conclusion drawn by Chinese military authorities is that while their forces must now prepare for the entire range of possible military conflict, the current international situation requires them to place greatest importance on preparing for small-scale wars and unanticipated crises. The PLA must therefore follow the principle of "walking on two legs" in its operational training.[38] Thus, even though the CMC's strategic guidance for the PLA's operational and tactical training over the past five years placed preeminent emphasis on preparation for local war, the armed forces have also sustained a focus on general and nuclear war.

NUCLEAR WEAPONS AND LOCAL WAR

A 1987 *Liberation Army Daily* essay stated that China's strategy for national defense in the twenty-first century "should be based on fighting major wars and fighting nuclear wars." [39] China's focus on major war prior to 1985 was deemed of critical importance because these preparations had prevented a major war and minimized the potential scale of such a war had it broken out. The author concludes that if China had focused only on preparations for limited and small-scale wars, then a major war could well have occurred. To be confident that future wars can be limited, preparation for large-scale and nuclear wars must continue.[40]

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[36] Jia Wenxian et. al., "Tentative Discussion of the Special Principles," p. 48.

[37] Zhang Taiheng, "Local War, and Development of Weapons and Equipment," *Jiefangjun Bao*, 1 June 1990, in FBIS-CHI, No. 116 (15 June 1990), pp. 26–227.

[38] Wang Chengbin, "Changes in Strategy and Deepening the Reform in Training," *Jiefangjun Bao*, 6 February 1987, in FBIS-CHI, No. 40 (2 March 1987), pp. K32–35.

[39] Zhang Jian, "It Is Still Necessary to Base Our Plans On Fighting a Major War," *Jiefangjun Bao*, 24 April 1987, in FBIS-CHI, No. 085 (4 May 1987), p. A2.

[40] Ibid.

This and other essays sought to establish linkages across the spectrum of conflict, with close attention to the role of nuclear weapons deployed by "medium" nuclear powers, such as Britain and France. It was asserted that at the root of any strategy pursued by a medium nuclear power is the understanding that their nuclear weapons free them from manipulation by the superpowers, thereby permitting them to play their role preferred in world affairs.[41] In particular, and in what may have been a reference to Vietnam, the argument was that in border conflicts or small wars where lesser nations act as agents for great powers, the nuclear retaliatory capability of medium-sized powers can perhaps prevent the interference of great powers.[42]

This approach to nuclear weapons and deterrence as they affect small wars is not new; observing that nuclear weapons make the world safe for small wars is a common, and seemingly accurate, position. To return to the four major exercises of 1988, the 2nd Artillery Corps—China's "Strategic Rocket Forces"—was a participant,[43] but no specific discussion of its roles and missions was provided. On the other hand, the Chinese armed forces have conducted exercises involving simulated battlefield nuclear weapons, and the East Sea Fleet conducted widely reported exercises in which they were required to operate in a nuclear environment.[44] Essays in *Liberation Army Daily* over the past five years have raised the issue of limited nuclear war and the role of nuclear weapons in offsetting weaknesses in conventional capabilities. Moreover, one author suggested that improvements in accuracy and the reduced explosive power of nuclear warheads has increased the possibility of their use in theater warfare.[45]

Citing a Brookings Institution study, *Liberation Army Daily* took note of the study's conclusion that in the 215 incidents involving American forces since World War II, the use of nuclear weapons was considered in at least 33 cases. Although nuclear weapons were not used, the author contends that China is surrounded by a "complicated environment, with more and more nations and regions possessing nuclear weapons in particular." As China prepares for conventional local wars, it must also develop measures for dealing with limited nuclear wars.[46]

Perhaps reflecting these concerns, China's missile forces have conducted exercises in which they prepared for "nuclear counterattack operations" during maneuvers designed primarily to test conventional war capabilities. Presumably, the responsibility of the 2nd Artillery Corps in the 1988 exercises was to be operationally prepared to launch a quick response to any use of nuclear weapons by the adversary—the PRC's stated doctrine and policy for the use of nuclear forces. Beyond the stated policy, such exercises would also fit Chinese military analysts' evaluation of the PRC's nuclear strategy. These analysts view China's nuclear forces as preventing a major power from threatening the People's Republic with nuclear war in order to deter Beijing from the course of action it had chosen. In this manner, nuclear weapons doctrine, strategy, and operations are brought together by theater-based campaign exercises in which conventional war fought for limited political objectives is the central focus.

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[41] Zhang Jianzhi, "Views On Medium-Sized Nuclear Powers' Nuclear Strategy," *Jiefangjun Bao*, 20 March 1987, in FBIS-CHI, No.062 (1 April 1987), p.K29.

[42] Ibid., p. K31.

[43] Xu Jingyao, "A Year of Reform," p. 36.

[44] (n.a.), "PLA Navy Carries Out Multi-Arms Defensive Exercise Under Conditions of Nuclear Warfare," *Jiefangjun Bao*, 19 July 1988, in FBIS-CHI, No. 144 (27 July 1988), pp.1819; and Wu Xuelin and Cao Guoqiang, "Naval Base Conducts Defensive Exercise Under Conditions of Nuclear War," *Renmin Ribao*, 2 July 1988, in FBIS-CHI, No. 128 (5 July 1988), p.47.

[45] Zhai Zhigang and Guo Yuqian, "We Should Not Overlook the Threat of Limited Nuclear War," *Jiefangjun Bao*, 11 September 1987, in FBIS-CHI, No. 186 (25 September 1987), p. 22.

[46] Ibid.

V. CONCLUSIONS: CHINESE DEFENSE POLICY IN THE 1990 s

Chinese military analysts believe that a successful defense policy and military strategy for China requires competence at all levels of warfare. In their view, success in small wars requires the ability to prevail in major conflicts, including those involving nuclear arms for deterrence and nuclear combat. With the normalization of Sino-Soviet relations in May, 1989, and the discussions of confidence and security building measures between Moscow and Beijing over the past year, China's defense problems are significantly reduced from what they were only five years ago. The military threat from the USSR is now minimal even though Chinese military analysts remain cautious in their interpretation of Soviet military capabilities. Thus emphasis on a defense policy placing primary importance on small-scale ware was prescient.

Nonetheless, a defense policy that places greatest importance on a military strategy focussed on China's periphery will do little to ease the apprehension of China's neighbors as they evaluate Beijing's growing military capabilities. This apprehension may be reduced for the near-term by the recognition that currently internal security requirements divide both the PLA's attention and funding. They will have noticed that elite "fist" units from several of China's military regions were among the forces used to bring order to the streets of Beijing. Over the longer term, however, if the present orientation toward defense policy and military strategy continues, including the role of nuclear weapons, the PLA's demands for more advanced technology to support the military operations required to implement China's military strategy will only serve to exacerbate the foreboding felt within the PRC's neighboring states. Although China insists that its military doctrine and strategy are defensive, the concepts of operations formed around the new paradigm of war are equally applicable to offensive force employment. Given the PLA's currently limited force projection capabilities, extended operations outside China are simply not plausible. For the longer term, however, the uneasiness of China's smaller neighbors will likely remain.

CHINESE MILITARY CAPABILITIES: PROBLEMS AND PROSPECTS

By Robert J. Skebo, Gregory K.S. Man, and George H. Stevens *

CONTENTS

Page
I. Background 663
II. Obstacles in the Way of Modernization 664
  A. Economic Constraints 664
  B. Technological Capabilities 665
  C. Political and Social Impediments to Military Modernization 666
III. Current and Future Capabilities 668
  A. Nuclear Forces 668
  B. Ground Forces 670
  C. Navy 671
  D. Air Forces 673
IV. Conclusion 674

BACKGROUND

During the last ten years, the combat capability of the People's Liberation Army (PLA), despite a broad-ranging modernization plan, has steadily declined. The Chinese military is falling behind rather than closing the gap on its principal threat, the Soviets. Indeed, even smaller regional neighbors are surpassing China's military technology base and deploying more sophisticated weaponry such as F-16s in Indonesia, Pakistan, Thailand and Singapore and K-1 tanks in South Korea.

The PLA began to modernize in the mid-1970s. Later, the lesson taught by the Vietnamese in 1979 provided impetus for expanded efforts. Eventually, in the mid-1980s, the leadership launched a systematic modernization program it hoped would produce a modern force capable of combined arms operations, with enhanced ground, naval and air strengths. However, because there was not enough money for large-scale deployment of modern weapons, Beijing adopted a two-track, interim approach involving reducing the size of the force, streamlining PLA organization, and improving training while simultaneously upgrading and fielding certain critical systems such as tanks, artillery, aircraft avionics, and command and control systems.

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After eleven years, and a world-wide search for weapons, technology, training, and assistance, there has been some progress. The size of the PLA has been reduced by over 1 million troops, its organization has become more efficient, and development of new weapons continues. However, the PLA is not well equipped, either to deal with the Soviet threat or to implement its new doctrine for prosecuting so called local wars of limited duration.

This evolving doctrine of "local wars" will only supplement the flexible, older, Maoist principle of "People's War Under Modern Conditions." People's War doctrine envisioned swift and mobile guerrilla harassment of an aggressor's over-extended supply line (and which therefore has severe limitations against an enemy with limited territorial objectives). This active and total defense strategy is based on the PRC's strengths of geography, manpower, organization, and size. It is a total war concept in which the entire population plays a role.

Local Wars doctrine, on the other hand, emphasizes rapid reaction, limited conflict, flexible response, preemptive action, and limited power projection to China's "strategic boundaries." The idea of power projection is a critical point in the doctrine of "local wars" since it implies that China wishes to operate beyond the nation's geographic borders. The Navy, in particular, will focus on the capability to defend territory within expanded operational areas that may reach to the limits of China's coastal seas.

II. Obstacles in the Way of Modernization

While Chinese military doctrine is changing, a number of obstacles stand in the way of achieving the capabilities to implement it. These problems fall into three basic, interrelated categories: economics, technological capabilities and political-social.

China's interim objective seems to be to upgrade its current generation of weapons, based mostly on Soviet designs, and to improve them with newer, primarily western subsystems. This is a difficult task, on which progress so far has been uneven (although impressive by lesser developed countries' standards). Much of China's effort appears directed at the export market rather than immediate domestic application so that Beijing can earn the foreign currency necessary to support its own research and development programs. Although the PLA has deployed limited quantities of newly developed equipment to demonstrate its effectiveness to potential buyers (like the A-5M FANTAN aircraft), there is no evidence suggesting plans for comprehensive replacement of any major category of equipment. This will not occur until well after the turn of the century because of China's overall domestic economic problems, its technological backwardness, and the tentativeness of the political climate.

A. ECONOMIC CONSTRAINTS

Beijing realizes that economic constraints rule out any attempt to rapidly replace all of the PLA's largely obsolete equipment. Given the size of the force the cost even of maintaining present capability constitutes a severe economic burden. An article in *JingJi YanJiu* (*Economic Research*), Sep. 1990, states that the recent, total published defense spending has remained at about 6-8 percent of GNP and that the upper ceiling for defense economic spending for the period 1985–2000 for China will be limited to roughly 5–8 percent of GNP. The defense budget appropriation increased by 5.22 billion yuan or about 30 percent during the 10 year period 1980–1989. However, during this period the official inflation rate rose 98.9 percent meaning that by 1989, the PLA actually had 50 percent less negotiable funds to operate with. In addition, official inflation rates are thought to reflect about half the real inflation in China. For example, actual inflation in China during 1989 was estimated to be about 33 percent, although the government's announced inflation was 17.8 percent.

Budgetary constraints have obvious impact on PLA operations and acquisitions. For example, the army is forced to devote a greater share of its total funds to the daily support of its deployed forces. As Major General Wan Qikan, President of the Academy of Military Economics in Wuhan, stated (in an interview published in *Renmin Ribao* of 29 June 1990) "as the rate of increase in military spending has been lower than that of price increases in recent years, to maintain the stability of the army, we had to increase the proportion of living costs in national defense spending and relevantly cut the proportion of purchases and maintenance of weapons. The decrease in spending and increase in prices means a drop in purchase power by a wide margin."

Also, the shortage of funds has forced the PLA to concentrate on building a foundation for weapons development rather than weapons production, and indeed Chinese research and development facilities can design and build some state of the art prototypes. However, defense industries cannot afford to make the facilities improvements that will make it possible to produce the prototypes in adequate quantities. China's progress in this regard was probably set back by the restrictions Western nations and Japan placed on military and financial transactions with Beijing in June 1989.

In order to help compensate for these shortfalls, the PLA itself is forced to generate about one-third of its funds. Under the policy of "self-subsidy and self-development," some PLA units sell civilian services and food staples and approximately one-half of PLA controlled factories produce consumer goods. The army also is a major player in the international arms market. However, it is not likely that these activities will solve the problem.

B. TECHNOLOGICAL CAPABILITIES

A *Jiefangjun Bao* (*PLA Daily*) 1 June 1990 article warns of the danger of war in China's remote border regions and that the PLA's weaponry "... cannot meet the needs of fighting in cold, hot, or jungle areas. When they reach 4,000 meters (13,125 ft) then weak points emerge." Later the article states that ..."to deal with local war the PLA needs to introduce technology and purchase patent rights from abroad and put more resources into China's own weapons programs." Finally it states, "we should fully realize that developing efficient military equipment is an important link in improving our army's combat effectiveness."

PLA leaders acknowledge that equipment obsolescence is probably the most serious long-term constraint on capabilities. Most of China's large conventional defense industry was established with Soviet help and along Soviet lines in the 1950s, and has developed little since the break with the Soviet Union in the 1960s. Dated Soviet designs, management methods, and production techniques are still in use. Workers lack state of the art skills, production is poorly integrated with research and development, and Beijing does not yet have broad access to advanced Western engineering and design methods. In short, China's defense industrial complex is simply not capable of the precision work necessary to produce new, modern weapon systems.

Chinese leaders acknowledge that these problems can only be overcome gradually. They further recognize their best chance lies in a policy that seeks limited and selective improvements in areas of greatest weakness, emphasizing self-reliance and economy. This less costly 'substitution value' road to modernization has as its basis getting better use out of what the PLA currently has in its inventory and in its technology base. The difficulties with this approach are illustrated by Beijing's experience with upgrading its F-8 fighter aircraft.

The F-8 was deployed in the early 1980s after a development program that lasted from 1964–1979. However, even after deployment the Air Force was not satisfied and sought to upgrade its capabilities in a new version to be called the F-8-II. The two basic areas for upgrade were the avionics and the engine. The F-8-II completed flight testing in 1987, but since the Air Force specifications were still not met, the Ministry of Aviation Industry and the Air Force decided to approach the U.S. government to upgrade the aircraft's fire control system at a cost of $500 million USD. Despite a promising beginning, and the expenditure of more than $200 million the program came to an end in May 1990 because of cost overruns, unforeseen technical problems, and schedule interruptions. The F-8-II program remains stalled in the development phase. After 26 years of work there are only a limited number of aircraft in the inventory, and none meets the operational requirements of the Air Force.

C. POLITICAL AND SOCIAL IMPEDIMENTS TO MILITARY MODERNIZATION

Since the founding of the PLA there has been an ongoing debate over the proper mix of political vs professional training. To date, there is no sign that a resolution of the tension is in sight.

Before the Tiananmen demonstrations, political training had virtually become the handmaiden of military training. However, since June 1989, up to 50 percent of all PLA training time is now focused on politics and ideology. A 17 June 1990 *JFJB* editorial on the three revised PLA regulations (Internal Management, Discipline, and Formation Drill) which were promoted and signed by the Chairman of the Central Military Commission (CMC), Jiang Zemin, on 16 June 1990, states that "the new regulations stress the party's absolute leadership over the army and the principle of strengthening the army politically." A 28 June 1990 *SCMP* article states that this call for military unity came directly from Deng Xiaoping during a late May informal meeting with the CMC. Deng is quoted as saying that "... the unity of the army is the lifeline of the republic. If the army is unified, it signals that the entire country is stable."

A 6 March 1990 *Ming Pao* report based on a Xinhua Wenzai article titled "General Trends," gives a different point of view and highlights some of the serious problems in today's PLA. Twenty PLA generals at group army (GA), military district (MD) political commissar (PC), and military region (MR) deputy commander levels strongly criticized unspecified leaders who were obstructing military reforms. In addition, these generals were worried about the decrease in PLA combat effectiveness.

Major General Chen Xianhua, former GA Commander and now Chief of Staff (COS) for Guangzhou MR, in a comparison of Chinese and Pakistani military training, said the PLA's training "is like middle school students attending a sports class." In an effort to solve the training problems, the leadership unveiled a new training regulation in July 1990. Initial impressions are that it is the most comprehensive and specific to date. It outlines specific individual, combined arms, and operational training. The regulation is designed to promote military-wide standardization, which has been lacking in the past. Furthermore, the regulation establishes strict standards for evaluating unit progress in training and prescribes detailed methods for higher headquarters to test subordinate units. Only time will tell if this new training program bears fruit. However, the competition imposed by required political indoctrination is certain to subvert its effectiveness.

Corruption is also a problem. In the same article Major General Ma Chunma, Political Commissar of Heilongjiang MD, points out that he can "punish corrupt officials (officers) but cannot change the practice of seeking personal gain by abusing power or officials harboring them." With increased contacts with non-Chinese manufacturers and agents and as the guarantor of party supremacy, the PLA has become fertile ground for corruption, influence peddling, and nepotism. Accordingly professional standards and orientations are degraded, military resources are diverted to other quarters, and overall capabilities decline.

A final point concerns the quality of PLA recruits. In the same March 6th report, Major General Li Guangxiang (no position given) states that the PLA is "backward in terms of professionalism, psychology, and social quality." He asks, "where is the first grade combat capability? The combat capability will not come from the annual recruiting effort." Even before Tiananmen the prestige and opportunities for advancement gained by joining the military were evaporating. A 29 April 1989 China Daily summary of a *China Youth News* article highlights the unsatisfactory physical and educational levels of PLA recruits. Quotas are not being met, urban recruits bring increased disciplinary problems. Because they lack educational background, rural recruits require additional basic education to prepare them for basic military instruction. The PLA is not attracting the high-calibre recruits necessary to use modern weapons and equipment.

III. CURRENT AND FUTURE CAPABILITIES

Having discussed some of the pitfalls facing today's PLA let us now consider China's military capabilities. A review of the PLA's numbers, developments, capabilities, and future prospects for each service is given below.

A. NUCLEAR FORCES:

Since its initial nuclear explosion in 1964, China has gradually deployed modest but survivable nuclear forces in order to deter both nuclear attack and coercive threat from external nuclear or conventional forces. Beijing takes great pride in having broken the U.S. - Soviet nuclear monopoly and it has developed autonomous nuclear forces that allow it to pursue an independent foreign policy in its own national interest. Chinese nuclear forces are roughly on a par with those of France; Beijing has neither the resources nor the desire to become a nuclear superpower and is content to maintain relatively small but credible deterrent forces. China has pledged never to initiate the use of nuclear weapons; its strategy is to ride out an initial strike and then retaliate with surviving nuclear assets. The credibility of China's nuclear deterrent is based on:

—survivability, which derives from the transportability of intermediate-range launchers,

—hardening and concealment of intercontinental silos and deployment within rugged terrain—thus complicating preemptive targeting,

—a periodic rotation of mobile launch units between hardened underground facilities and austere launch pads,

—varied modes of air, land and sea-based deployment,

—and from camouflage, deception and uncertainty.

China's initial land-based ballistic missile systems were of limited range and used non-storable propellants. The DF-1/SS-2 (*Dongfeng* or East Wind) and CSS-1 short and medium range ballistic missiles (SRBM/MRBMs) had ranges of 600 and 1200 km, used non-storable propellants, and carried small fission warheads with a yield of about 15 kilotons. By about 1969 Beijing developed the more reliable CSS-2 intermediate-range ballistic missile (IRBM), which used storable, more stable propellants and could deliver a 1-3 Megaton thermonuclear warhead over a distance of some 3,000 km. By adding a second stage to the CSS-2, Beijing achieved the CSS-3, an intercontinental ballistic missile (ICBM) with a limited range of some 7,000 km which was used to launch China's first two satellites in 1970-71. Still heavier satellites were launched by a new booster after 1975; known as the CSS-4, this ICBM was launched over a distance of approximately 10,000 km into the Pacific in 1980; it can probably strike targets throughout the U.S.

The SS-2 SRBM and CSS-1 MRBM are now retired to parks and museums in Beijing. The mobile CSS-2 IRBM is still widely deployed and is the backbone of China's survivable deterrent. Beijing probably has over 100 CSS-2 IRBMs for four to five dozen CSS-2 launchers, although recent sales of the system to Saudi Arabia may have slightly reduced this force. China probably has less than 30 ICBMs. Chinese publications indicate that the CSS-3 is transport-able and is launched from both silos and launch pads. The much larger CSS-4 is probably confined to silos. Although the CSS-4 originally carried a 4-5 Megaton warhead, Beijing now has the technology to multiply the effectiveness of its limited number of ICBMs by reequipping the CSS-4 with 3-4 multiple independently-targetable reentry vehicles (MIRVs). Refire missiles probably are available for CSS-3 launchers, but not for hot-launch CSS-4 ICBM silos.

In addition to its land-based ballistic missile forces, China also has a small stock of nuclear weapons for air and sea delivery. During the 1960s, to overcome the range limitations of the SS-2 and CSS-1, Beijing developed a thermonuclear bomb with a yield of 1-3 Megatons that could be carried to a distance of some 3000 km by its fleet of at least 100 B-6/BADGER (Tu-16) intermediate bombers. China also has over 150 B-5/BEAGLE (Il-28) medium range bombers and some 500 A-5/FANTAN ground attack fighter which can carry small fission bombs to distances of about 1000 and 800 km, respectively. Beijing's combined stockpile of nuclear bombs probably totals less than 100, and the older fission bombs likely will be replaced by newer, small-yield thermonuclear warheads, such as the neutron bomb Beijing is now developing. Today, however, this aerial component is the weakest link in Beijing's nuclear triad. For example, China's Il-28 BEAGLEs are almost ready for retirement, and replacement bombers are unlikely. An H-Bomb laden Tu-16 BADGER, formidable in the late 1960s, probably would not survive contemporary Soviet air defenses. The A-5 FANTAN is more likely to be used in a tactical role rather than as a strategic system.

China has one older GOLF Class diesel powered ballistic missile submarine (SSB) with tubes for 2 JL-1 (*Julang* or Great Wave) submarine launched ballistic missiles (SLBMs) and one XIA Class nuclear powered ballistic missile submarine (SSBN) with tubes for 12 JL-1 SLBMs. The JL-1 has a range of about 2,000 km, and was successfully launched from the GOLF in 1982 and from the XIA in 1988. The JL-1 is also the first of an entirely new generation of solid propellant missiles that eventually will displace China's older and more cumbersome liquid propellant systems. Several new SRBMs are being developed for the international arms market; two of these, the M-9 and M-11, are good candidates for deployment in a tactical nuclear mode. Solid propellant MRBM, IRBM and ICBM classes probably are already in design and could be deployed within the decade.

In the 1990s Chinese nuclear forces will continue to modernize at a slow, yet deliberate pace to improve the accuracy, reliability and survivability of future systems. Deterrence will remain as the primary strategic use of the force due to its limited size and the uncertain accuracy of its warheads. China will probably need to try to develop:

—a new generation of more stable solid propellant missile systems,
—a tactical nuclear weapon to support ground forces,
—the effectiveness of its ICBMs with the use of Multiple Independently-targetable Reentry Vehicles (MIRVs), and

—the ability to deploy Submarine Launched Ballistic Missiles (SLBMs) to augment the present land-based force.

Advances in these areas will be slowed by the technological, economic and political constraints discussed earlier.

B. GROUND FORCES

The PLA remains basically an infantry force. Despite some small improvements in truck mobility and mechanization since 1979, the ground forces do not have the mobility required of a modern army.

China's ground forces have the firepower to deter and, if necessary, mount an effective defense against any conventional attack. However, even after eleven years of modernization efforts the PLA has very limited ability to project its power. Away from rail lines and airfields, the lack of adequate logistical, transport, air defense, communications, armor, and air support severely limits its capabilities. Development of rapid reaction units in each group army, many of which were employed against the demonstrators in June 1989, will eventually result in enhanced ground force projection capabilities, but this probably will not happen until well into the future.

The Type 59 (Soviet T-54) continues to be the PLA's primary tank. Of late 1950s vintage, the Type 59 has been followed by incrementally improved models known as the Type 69, 79 and 80 tanks. Although these improved versions mount western cannon, optics, and range finders, they have been produced principally for foreign sales and only about 200–300 have been deployed to PLA units. Prototype tanks to replace the Type 59s have been under development for over 10 years with the help of various nations. However, Beijing seems unable to decide which prototype will best meet the needs of the next century

Currently, China's self propelled (SP) artillery, towed artillery and multiple rocket launchers have strength in numbers and have achieved significant systems and ammunition enhancements. However, SP systems continue to have difficulties. For example, the Type 83 152mm SP was put together for the 1 October 1984 National Day Parade, then returned to the factory to solve integration problems. The system did not work and is still not deployed in significant numbers. PLA artillery capabilities have been helped in some areas by the acquisition of counter battery radars, which are used in the destruction or neutralization of indirect fire weapons systems. These radars will increase capabilities somewhat, but the problems of integration still remain.

With respect to surface to surface missiles (SSM), the M9 and M11 solid propellent systems are still under development and testing, but the overall status of the program is not known. Prototype missiles were first shown at arms shows in Beijing in 1986 and 1988. The M9 was said to have a maximum range of 600 kilometers and the M11 290 kilometers. The incentive to export these systems is high and, as with tanks and military aircraft, China may well continue to assert its role as a supplier of these types of low cost military equipment.

Gun systems still form the backbone of PLA Air Defense Artillery (ADA) units. China only has two operationally deployed air defense weapons, the HN5 and the HQ-61, both of which use older technology. The HN5 infra-red (IIR) surface-to-air missile (SAM) is based on 1960s Soviet SA-7 Grail technology and the HQ-61 is based on 1970s technology similar to that found in the U.S. Sparrow. ADA requires significant coordination between air defense brigades and SAM units and China still encounters problems in command and control of these systems.

The PLA Aviation Corps comprises a polyglot mix of Soviet and Western systems running the gamut from Soviet HIP to French GAZELLE helicopters. Testing and experimentation continues on lift, antiarmor capabilities and tactics. Apart from acquisitions and standardization, a major problem facing army aviation is the apparent difficulty of maintaining and keeping modern equipment operational. This diversity of equipment may well reflect PLA inability to determine the scope, roles and missions of its Aviation Corps. The Chinese apply maintenance to their army aviation assets only when a weapon system is broken. Preventative maintenance is not accomplished on a regular basis and a significant number of DAUPHIN and S-70C/BLACKHAWK crashes have occurred.

Ground force units demonstrated excellent use of civil and military rail and air assets to move over 200,000 main force troops to the capital in 1989. This was the largest movement of troops, given the short time span, since the Korean conflict. However, operations in the capital revealed many problems. The PLA was not a trained internal security force, there was little or no riot control training or equipment, and the leadership was confused. This led to tragic results.

Improvements in logistics, organization, personnel management, and training will continue to lay the foundation for later integration of more sophisticated weaponry. This is the least costly solution since it avoids buying weapons from outside sources and at the same time builds indigenous weapons development programs. By placing more emphasis on military training, China will improve the capabilities of both the officers and individual soldiers at a lesser cost and thereby increase overall the PLA's capability.

Budget constraints will force the Chinese to concentrate on building a defensive army capable of limited regional offensive operations. To that end, the future will bring an increase in the formation and deployment of rapid reaction units to fight in local war situations. Together the group armies will deploy about 10,000 tanks which will be improved to achieve a slight increase in capabilities. The ground forces will also increase the number of APCs—from the present 3,000 to improve mobility. The number of field artillery weapons—currently at about 13,000—will remain about the same, but mobility and survivability will be enhanced. Finally, the ground forces will attempt to improve light armed helicopter assets to better support the local war doctrine.

C. NAVY

Traditionally a coastal defense force, the PLA Navy is slowly developing a limited regional power projection capability. Currently the major surface combatants are its destroyers and frigates. The submarine force, although large, is limited to engaging surface ships with older torpedoes using WW-II tactics. China's submarines are no match for a modern anti-submarine warfare force. The Navy does have significant value in asserting China's claims to disputed islands in the South China Sea.

China has one operational XIA class SSBN equipped with CSS-N-3 SLBMs. It is doubtful that any more of these expensive systems are under construction. Four HAN class SSNs are operational but do not venture far from their home ports. The principal tactical submarine is the ROMEO class diesel submarine, which is a 1950s vintage, Soviet designed system. Both the HANs and ROMEOs are fitted with dated, 1970s-type sensors and weapons.

The PLA Navy's 56 principal combatants make it the third largest navy in the world. The LUDA destroyers and JIANGHU frigates have significant problems with on board weapons, equipment, and powerplants. The Navy is trying to upgrade these platforms with both indigenous and foreign systems and engines. Key deficiencies and areas targeted for development are air defense, surface-to-surface missiles, electronic warfare, command control and communications (C3), and integrating these systems for effective operations.

The majority of China's three naval fleets are made up of patrol and coastal combatants. These are organized geographically into the North Sea, South Sea and East Sea Fleets. Because of their age, most of the vessels are ineffective on the open seas but useful for coastal defense. Navy minelaying capabilities have been strengthened with the deployment of the WOLEI minelayer which represents China's largest class of domestically produced minelaying vessels, able to carry over 300 mines.

The amphibious fleet grew during the 1970s but, little has been added since that time. Currently, the Navy has the basic sealift for one infantry division with tanks for a 30 day deployment. This could provide enough force for a South China Seas Spratly Islands operation but nothing larger. Also hundreds of civilian merchant and fishing vessels could be employed to transport troops in a non tactical operation

PLA Naval Aviation units can cover Chinese ports and installations but the lack of aerial refueling capability prohibits coverage of fleet operations beyond the range of coastal airfields. Also, open ocean training with naval units is rare. The Navy's primary attack aircraft is the A-5/FANTAN which has a particularly limited combat radius of about 150 to 400 nautical miles—with an auxiliary fuel drop tank. This severely limits its over water strike capability. In addition, most aircraft operations are limited to clear weather, daytime operations, due to a lack of sophisticated avionics and pilot training.

Naval modernization will constitute an increased threat to Taiwan. The threat could manifest itself through an increased emphasis on antishipping roles or a blockade of the island. It would be difficult for Taiwan to counter either of these operations effectively.

In the 1990s the naval forces will continue to build an organization able to defend territorial claims out to the limits of China's coastal seas. The production rates for ships will slow, but quality will continue to be stressed over quantity. Weapons and electronic upgrades will continue on existing ships and concentrate on improving ASW and air defense capabilities to support limited power projection to the limits of China's coastal seas.

D. AIR FORCES

The evolution of aircraft in the PLA has taken many twists and turns. Western acquisitions have improved the A-5/FANTAN with a relatively up to date navigational/attack system. Avionics are being acquired for the F-8-II. However, as noted earlier the direction of this program is not clear at this time. The F-7 AIRGUARD (an upgraded MiG-21) has been improved with foreign radar, head-up display, a new computer, radios, and identification friend or foe (IFF) systems. Joint development has begun on a new jet trainer with Pakistan. Chinese aerial missile systems are being significantly improved with access to foreign missiles. However, PLA Air Force capabilities are seriously hindered by obsolete airframes and powerplants.

Many aircraft are reaching the end of their operational life. In the West most fighter airframes are considered reliable only through 25–30 years of service. At that time, regardless of the number of hours flown, point stress fractures, corrosion, and fatigue make the airframe less stable and reliable. Most Chinese aircraft are reaching this stage. China's tradition of poor periodic maintenance compounds the difficulties.

China's 2,700 F-6 fighters are based on the Soviet MiG-19 FARMER, which began production in the late 1950s. This aircraft is the backbone of the Air Force and a possible replacement aircraft is under development. According to Chinese reporting this aircraft, called the *Xin Jian* (new fighter), will approximate mid-to late-1970s design technology.

China also deploys the F-7/FISHBED, the Soviet MiG-21, which was first delivered to China before 1960. Although the FISHBED is a proven fighter, only about 500 have been deployed. Improved versions such as the AIRGUARD and F-7-3 have been flown. However, these aircraft will not be produced in sufficient numbers to replace the F-6 FARMERs, since the Chinese realize the inherent limitations of the 1960s designed airframe.

The F-8 interceptor began development in the late 1960s, and the PLA currently has about 80 in the inventory. Under the U.S. Peace Pearl program, the F-8 was to have been a stepping stone to a next generation fighter. However, as noted, the program is unlikely to be revived due to financial and technical problems.

The A-5 ground attack aircraft began in 1958 as a design to transform the MiG 19 into a close air support aircraft of which there are about 550 in the inventory. A prototype flew in 1965 and a number were deployed to the flying units. Some were sold to North Korea and Pakistan in the 1970s and 1980s. Under a 1986 contract, the A-5 was upgraded with Italian avionics based on the Italian AMX fighter and an improved Chinese engine. The aircraft is being produced mainly for foreign sales but some Air Force and Navy A-5s can be refitted in the future.

In 1988, the FB-7 fighter-bomber was unveiled and is being developed as a maritime attack aircraft for the Navy and an all weather interdictor/strike aircraft for the Air Force. The Chinese state that it will be in the same class as the Soviet SU-24/FENCER. If it enters production it may have a terrain following radar and avionics of Chinese design and manufacture. However, at this time it appears that little progress has been achieved.

China's bomber force is dependent on the 1960s vintage B-6 BADGER, with about 130 in the inventory. Its slow speed and poor electronic counter measure capability give it a low probability of survival in the modern aerial warfare arena. The C601 antishipping missile will help the B-6's standoff capabilities but lack of aerial refueling limits any fighter protection for China's bomber force.

Of China's 250 transports, 200 are short range, 45 are medium range, and 5 are long range transports. Most short range aircraft are Y-5 COLT biplanes. Some Tridents are available for VIP and special cargo flights and there are limited numbers of Y-7 and Y-8 aircraft based on the Soviet AN-12 and AN-24 transports. The Y-8 is being developed in a number of variants for refueling, AEW, and surveillance missions. The cutoff of Western contracts and military assistance has hindered these programs. As in 1989, China's civil aviation corporations stand ready to support PLA operations.

In the coming decade, capabilities will continue to fall behind Western nations due to the PRC's dependence on western technology, political instability, and inability to indigenously produce and field modern aircraft. As interceptors, ground attack, bomber and transport aircraft age, they will not be replaced by any new airframes, because there are no airframes ready to go into production. Existing aircraft will continue to have incremental upgrades to avionics and weapons systems, but the government will find it difficult to maintain a modernization momentum into the next decade. To this end Beijing may be forced to cut back or completely drop some of its new systems envisioned for the 1990s and beyond. If it is forced to drop one of its programs the New Fighter—a follow on to the F-8-II—will be the first to go.

IV. CONCLUSION

For the past 15 years the PLA has been a force in transition trying desperately to reform itself and join the ranks of the world's modern military forces. To date actual improvements have been slow and incremental. Manning has been reduced, the reorganization has established a solid foundation to build upon, and some excellent research and development and think tanks have been established. However, professionalism continues to be hampered by the requirements of correctness, weapons upgrades cannot be adequately funded, and a real question remains about China's defense industry's capability to produce functional modern weapons and equipment.

As in the rest of China, much emphasis is placed on symbolism rather than substance. For example, the Navy's XIAs and HANs rarely get underway. If China should acquire an aircraft or helicopter carrier it too would be a symbol. What aircraft or helicopter can or will China obtain or develop to put onboard? How would it fight off enemy air, surface combatants, and submarines? Although the PLA's capabilities to defend the homeland are high, there is little fear of successful Chinese military operations beyond the Spratlys.

There is some optimism for the future. There are outstanding, highly-professional military leaders who want to bring the PLA into the modern world. They support the economic reforms necessary to provide technologically advanced production facilities and the funds to operate them. But until these military leaders can be sure of the political and ideological winds and of a new leadership that will support their efforts, these professionals will be forced to make do with the equipment, men, and opportunities they presently possess.

INTERPRETING TRENDS IN CHINESE DEFENSE SPENDING

By James Harris et al. *

CONTENTS

	Page
Summary	676
I. China Reverses Trend Line on Defense Spending	677
II. Paying for Domestic Security	679
III. Other Areas Requiring Funds	680
IV. The Competition for Future Resources	681
V. Research for Longer-Run Requirements	683
VI. Prospects	684

FIGURES

1. The PLA Budget: Short Shrift for the Common Soldier	679
2. Interpreting Trends in Chinese Defense Spending	682

SUMMARY

Beijing raised the official state defense budget for 1990 to 29 billion yuan ($6.1 billion)—the first real growth in formal defense spending in eight years and a reversal of a decade-long decline in the military's share of the state budget. Beijing is probably responding to operational and morale problems in the People's Liberation Army (PLA) that are increasing its concerns about the ability of the Chinese military to meet future domestic crises. Some of the increase is undoubtedly intended to defray the costs of deploying troops during the Tiananmen crisis in June 1989 as well as the continued costs of garrisoning large numbers of paramilitary police and soldiers in Beijing. In addition, a portion of the new funds is likely to be used to improve the living conditions of the average soldier as well as to help pay for the retirement and demobilization of over a million Chinese soldiers since the mid-1980s.

The true increase in resources devoted to the Chinese military is clouded by the fact that the PLA receives an equivalent level of funds from such extrabudgetary sources of revenue as arms sales and Army-run business as well as from defense-related allocations in the budgets of other Chinese Government organizations. These funds may actually push China's defense budget for 1990 past 57 billion yuan ($12 billion). Thus, while Beijing claims it spends less than 1.8 percent of gross national product (GNP) on defense, the actual number may be closer to 3.5 percent.

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* This paper was prepared by James Harris and other analysts from the Office of East Asian Analysis, Central Intelligence Agency. Information available as of November 20, 1990, used in this report.

There are indications, moreover, that China's military spending may be ratcheted up further in years to come. Beijing is likely to come under continuing pressure from its various military services for greater outlays for weapons modernization. They seek more funds for priority weapon development programs that Chinese press accounts indicate have lagged as a result of the PLA's shrinking budget. Military demands for increased research and development funding are also likely to grow significantly over the next decade if China is to bring new military technologies on line by the twenty-first century. Chinese press reports suggest that an increasing proportion of these funds may go to achieve breakthroughs in such high-technology areas as space, composite and new materials, advanced manufacturing processes, and information systems.

In arguing for additional funds, China's military leaders will probably play successfully on Beijing's sense of vulnerability over the loyalty of the army as well as the Chinese leadership's fears of such potential regional adversaries as India and Japan. The remaining question will be how much of China's defense spending comes from the official budget and how much is financed from other sources. In either case, the key issue facing Beijing today is probably not whether defense spending will grow, but by how much.

I. China Reverses Trend Line on Defense Spending

Chinese Finance Minister Wang Bingqian on 21 March 1990 announced a 15.2 percent hike in official state funding for the People's Liberation Army (PLA) in 1990,[1] the first real growth in the official defense budget since 1983 and the second consecutive year that Beijing has increased monies allocated to defense.[2] If annual inflation remains below Chinese predictions of 5 percent for 1990—the inflation rate rose only 2.3 percent in the first nine months of this year, according to recent Chinese statistics—this year's budget of 29 billion yuan ($6.1 billion) will represent a real increase of at least 10 percent for the PLA.

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[1] "Wang Bingqian's Budget Report," Xinhua News Agency, 7 April 1990.

[2] Beijing announced a similar 15-percent increase in the military budget for 1989, but an unexpectedly high inflation rate of 17.8 percent eroded the benefits of that raise. Moreover, in previous years the military budget fared even worse, declining at an average annual rate of 5.8 percent in real economic terms during the 1980s, according to Chinese Government reports. The last real growth in the military budget occurred in 1983, when real spending power increased by only 4 percent.

There are several sources of revenues and subsidies available to the PLA that do not appear to be included in the official Chinese defense budget (see figure 1):

- **Arms sales.** Despite Chinese arms' low prices and the high variability of profits on each sale, arms sales are an important source of hard foreign currency that can be used to import Western military technology and equipment. One Western research organization estimates that between 1985 and 1989 China exported $6.9 billion worth of military hardware.[3]
- **Entrepreneurship.** PLA-run commercial enterprises also generate significant revenues, and profits have been increasing 15 to 20 percent annually during the past several years, according to Chinese press reports.[4] The PLA's business activities are likely to continue to increase, even with government austerity measures in place.
- **Agricultural production.** Extensive agricultural cultivation by PLA units also contributes to the military budget by reducing the amount of money Beijing has to allocate for subsistence. For example, PLA farms in 1989 grew more than 2 billion kilograms of grain, meat, and dairy products, according to the Chinese press.[5] If purchased at market prices, these foodstuffs would have cost the military over $1 billion. Moreover, PLA agricultural production is likely to increase this year to offset inflated retail food prices, to better meet soldiers' nutritional needs, and to sell more produce at higher, free market prices. Recent Chinese press reports indicate that PLA farms reaped a bumper summer harvest this year as agricultural output increased 10 percent over 1989.[6]
- **Other budgetary funds.** There may be allocations in the state budget that are intended for national defense projects. For example, money earmarked for the National Defense Science, Technology, and Industry Commission (NDSTIC), the State Science and Technology Commission (SSTC), and defense-related ministries may be used to fund military research and development.
- **Military pensions.** According to Chinese press reports, there are now more than 5 million former military personnel and dependents receiving assistance from the Ministry of Civil Affairs.[7]
- **People's Armed Police and military reservists.** The People's Armed Police (PAP) annual budget is not accounted for in published defense figures because it was removed from PLA control in the mid-1980s. In addition, the costs of China's reserve forces—more than 50 divisions are cited in the Chinese press—are probably being paid out of provincial budgets.

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[3] Stockholm International Peace Research Institute, us SIPRI Yearbook 1990, Oxford University Press, London, 1990, p. 221.

[4] Liberation Army Daily, 29 December, 1989.

[5] Xinhua News Agency, 13 April 1990.

[6] Xinhua News Agency, 13 July 1990.

[7] Xinhua News Agency, 27 March 1990.

II. PAYING FOR DOMESTIC SECURITY

The bulk of the increased defense allocations will probably not be used to buy weapons to meet an external threat but primarily to meet pressing problems that are increasing Beijing's concerns about the ability of the Chinese military to quell any future domestic crisis. Senior Chinese leaders have repeatedly referred to a window of opportunity that may last for the next 15 years in which Beijing will face no immediate external threats.[8] Thus, the money will probably be targeted primarily on three areas: to pay for the added operational expenses associated with deploying troops to Beijing since last year's crackdown and increasing the internal security apparatus throughout China, to improve the readiness level and morale of units by increasing spending on equipment maintenance and salaries for the soldiers, and to ease the lot of retired PLA soldiers.

Although Beijing has provided no specific information, part of the budget increase will almost certainly defray the costs of deploying troops to Beijing during the Tiananmen crisis in June 1989 as well as the continued costs of garrisoning nearly 100,000 paramilitary police and soldiers in Beijing.[9] Although no major unrest has occurred since mid-1989, the leadership's fears of the population will no doubt compel it to maintain a large garrison in and around the city for the foreseeable future.

FIGURE 1. PLA BUDGET: THE DECISION MAKING PROCESS.

The General Logistics Department (GLD) in Beijing holds the overall responsibility for creating the annual PLA budget, but final authority rests with the Communist Party's Central Military Commission (CMC) and the State Council. Rather than mandate the budget from above, the GLD assembles the budget through consultation with the General Staff Department, the service arms, and the military regions. The decision-making process may be as follows:

- In the first part of the year units down to the division level appraise their current strength and assess their fiscal requirements.
- Staff departments and military regions submit their budgetary requests to the GLD in the fall. The GLD reviews these submissions and makes adjustments it believes appropriate.
- The Ministry of National Defense probably submits the proposed budget to the State Council, which returns the budget to the GLD by the end of the year for implementation.

The CMC probably focuses on weapons procurement and development—deciding what funds are to be allocated on key weapon systems and determining what proportions of this funding will come from the military budget, the State Council, and separate budgetary accounts. Finally, the National People's Congress rubber-stamps the military budget each spring.

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[8] "Chen Yun Presents New Political, Economic Strategy," Asahi Shimbun, 18 September 1989.

[9] "Security Forces 'Boosted' in Beijing for Asian Games," South China Morning Post, 5 September 1990.

The Chinese military also appears to be enhancing the operational readiness of its military and paramilitary forces in the Beijing area by replacing equipment lost during the Tiananmen incident with new, more advanced gear. The Chinese leadership, for example, is equipping its paramilitary forces in Beijing with riot-control equipment as demonstrated in the September issue of *People's Liberation Army* Pectoral. Most of it is such nonlethal equipment as helmets, face shields, water cannons, rubber bullets, and tear gas, but the Chinese have also fielded armored, antiriot vehicles with their security forces.

Additional funds will probably also go to maintaining security outside Beijing. China is significantly increasing the size and operational capabilities of the PAP by creating new riot-control units in major cities throughout China and by staging public displays of their skill, according to Hong Kong press reports.[10] The new PAP unit formed in Guangzhou, for example, demonstrated its riot-control tactics and equipment to city officials this summer. The Chinese media also announced this summer an unusual winter recruitment drive possibly to flesh out some of these newly formed units.[11]

Beijing is also evidently revamping largely moribund party militia units—composed of ideologically reliable workers—under the control of provincial party officials. Shanghai officials mobilized over 20,000 militia during the 1989 crisis to assist local security forces in removing student roadblocks, monitoring worker attitudes, and controlling traffic. Since then, Beijing has been encouraging local authorities to establish "emergency militia detachments" and step up training to ensure that local militias could respond quickly to new unrest.[12]

Finally, the Chinese military is maintaining a substantial—and costly—presence along its remote frontiers. Beijing has long garrisoned a substantial security force in Tibet and it is still in place, even after martial law was lifted from the Tibetan capital of Lhasa in May 1990, according to Western travellers who have recently visited Tibet. Over the past two years, China has been building and maintaining a presence on islands it occupies in the South China Sea, as demonstrated in various Chinese publications, such as *Jianchuan Zhishi* (*Ship Knowledge*).

III. OTHER AREAS REQUIRING FUNDS

The Chinese military will probably also spend a large portion of this year's additional money on projects to improve the living standards of the average soldier, in order to make the troops—which the regime is counting on for support—happier. Soldiers' poor living standards no doubt are a major contributor to the low morale and discontent that Hong Kong press accounts indicate have plagued the PLA since the Tiananmen incident.[13]

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[10] Kuan Chiao Qing, No. 212, 16 May 1990, pp. 6–9.

[11] Liberation Army Daily, 7 July, 1990.

[12] "Grasp Key Points, Do a Good Job in Reorganization," Liberation Army Daily, 20 January 1990.

[13] Willy Wo-Lap Lam, "Analysis," South China Morning Post, 3 October 1990.

Some of the new funding will probably be used to augment existing programs designed to bolster morale:

- **New construction.** According to reports in the PLA's *Liberation Army Daily,* Beijing is constructing numerous new facilities for the troops including multistory barracks, improved roads, and training and logistic bases. Many of the old barracks had cracked walls, broken doors and windows, and tiles falling from roofs.
- **Increased food supplies.** Liberation *Army Daily* reports also indicate General Logistics Department (GLD) Director Zhao Nanqi told an all-Army forum on grassroots production in April that the PLA would step up its agricultural production to increase food supplies.

Finally, Beijing's decision to drastically reduce the size of its standing army from some 7 million men in the late 1970s to less than 4 million men today has imposed **retirement costs** that the PLA must currently bear.[14] The costs associated with demobilizing more than 600,000 men each year, including providing generous retirement benefits for the 32,000 ranking PLA and PAP officers discharged this year, are also likely to be a heavy drain on PLA finances.[15]

IV. THE COMPETITION FOR FUTURE RESOURCES

Although the Chinese leadership appears to be using increased defense spending for needs other than hardware, the PLA's various service arms will no doubt press for a greater share of state funds to support individual weapons modernization programs. Senior service arm commanders are likely to support their arguments for increased funding by citing articles in the official Chinese military press predicting that regional arms races, particularly in the Asian-Pacific region, will intensify in the 1990s and raise the danger of local wars breaking out on China's periphery. These PLA officers are also likely to play on Beijing's fear of a militarily resurgent Japan to buttress their calls for increased spending on new weapon technologies for the 21st century.[16]

Nuclear Missiles. On the basis of the wide variety of new missile and rocket technologies displayed at international arms fairs over the last several years, China is probably engaged in a major—and costly—modernization program to replace most of its 1960s-vintage nuclear missile systems with new technology.[17] Because maintaining a credible deterrent will continue to be a top priority of Chinese leaders, Beijing will almost certainly provide the nuclear forces with sufficient funds for major projects even if it means re-

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[14] Central Intelligence Agency, "The Chinese Economy in 1988 and 1989: Reforms on Hold, Economic Problems Mount," p. 17.

[15] China Daily, 19 October 1990.

[16] A recent analysis of the present world military situation published in the *Liberation Army Daily* on 7 September 1990 exemplifies the current strategic thinking of many Chinese military officers. The author predicts that the diminution of US-Soviet military rivalry will cause some large countries in the Third World to "step up the pace of military buildup and to carry out military intervention in other countries." The analysis singles out Japan for criticism, noting that Tokyo's military expenditures rank third in the world and concluding that Japan "possesses the conditions to become a military power."

[17] Jane's Information Group, "China in Crisis: The Role of the Military," Surrey, United Kingdom, 1989, pp. 109-116.

FIGURE 2. THE PLA BUDGET: SHORT SHRIFT FOR THE COMMON SOLDIER.

For the past several years, top PLA leaders, including Chief of General Staff Chi Haotian, have publicly argued that the military budget was inadequate. As late as this June, PLA officials continued to make calls in academic journals for increased defense spending to ensure the livelihood of their soldiers as well as to modernize the military.

Soldiers' pay lost much of its real purchasing power during the second half of the 1980s, according to the analysis in *Junren Gongzi* (*Military Wages*), published last year by the PLA-run Liberation Army Press. By 1989, for example, first-year enlisted men had no disposable income as compared with a modest 12–13 yuan each month in 1985. Many, if not most, junior enlistees rely on friends, family, sideline work, or illegal activities to augment their pay. In contrast, while the average urban worker's disposable income has fallen over the past few years because of inflation, It remains over 25 percent of his basic wages or about 25 yuan each month, according to Chinese Government figures. Rural workers also retained a sizable portion of their annual earnings as disposable income, ranging from 22 to 32 yuan each month.

Not surprisingly, officers receive much better treatment from the PLA than enlisted men. According to the same PLA publication, they receive enough money to support themselves and half the expenses of an additional person. This may not meet many officer's needs, however, because Chinese Government statistics indicate that, on average, each employed person must care for three other people—including children and aging parents.

ducing the amount of money allocated to other service arms for procurement.

Naval Programs. The Chinese Navy also appears to be pressing for more funds for modernization in the wake of its clash in March 1988 with Vietnamese naval forces in the disputed Spratly Islands. Senior Navy officers are also concerned about the potential threat posed by other regional navies; India's acquisition of powerful surface warships and Japan's goal of developing its naval forces to defend its sea lanes out to 1,000 nautical miles are particularly worrisome. Various reports in the Western media suggest that the Navy's priorities include surface-to-air missiles to provide protection from an attack and allow Chinese warships to operate at greater ranges from the mainland, in-flight refueling to extend the combat ranges of the Navy's fighter and ground attack aircraft, and an airborne early warning capability to better monitor air and sea traffic in the ocean areas bordering China.[18]

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[18] Ngok Lee, "Chinese Maritime Power: Towards Modernisation," *Naval Forces*, Vol. 11, No. 2, 1990, pp. 89–95.

Air Force Programs. Beijing continues to stress air force modernization to offset the challenge posed by the increasingly advanced aircraft that India and Taiwan have already deployed or will soon field. The acquisition of foreign technology has been a costly, but crucial part of the Air Force's modernization drive over the past decade; Beijing will probably continue to plan major spending for a new-generation fighter aircraft, advanced radar-guided missiles, and upgrades to existing combat aircraft.[19] China, for example, has initiated competing programs with Italian and French firms to improve the weapons delivery capability of its ground attack aircraft, the A-5. The Chinese Air Force's need for modern weapon systems is apparently urgent enough that Beijing is considering acquiring jet fighters from the Soviet Union.[20]

Ground Force Programs. China's ordnance industry appears to be pursuing an aggressive—and costly—research and development strategy designed to "leapfrog" the technology gap between China's obsolescent ground force weapon systems and those of the West and the Soviet Union. Chinese weapon manufacturers, for instance, have unveiled numerous prototypes of new ground force equipment at international arms exhibitions. According to Western journalists attending the shows, it is comparable to modern equipment in Western and Soviet inventories.[21] Given the absence of any pressing external threat to its security, Beijing is likely to field limited numbers of new weapon systems to a few elite units for evaluation and training. Nonetheless, China has the military production infrastructure to quickly begin producing an array of high-quality weapons—including main battle tanks, armored fighting vehicles, artillery, and air defense weapon systems.

V. RESEARCH FOR LONGER-RUN REQUIREMENTS

In addition to outlays for ongoing weapons programs, increased funding for research and development will almost certainly be needed if Beijing is to field more advanced weapons in the twenty-first century. The goal of such long-term development programs would probably be to provide the military with sophisticated weapon systems that might include more capable strategic missiles, stealth and counterstealth technologies, new ships and submarines for the Navy—possibly including an aircraft carrier—and rapid mobility for the Army.[22]

Besides these programs, the Chinese military probably will require more money to research and develop even more advanced, defense-related technologies in the mid-to-late 1990s. Although most of the funding for such long-term research probably does not come directly out of the military budget, the PLA nonetheless will have to pay a portion of these costs. Consequently, the Chinese military and its subordinate research and development units are likely to be heavily involved in a 13-year modernization plan—the 863 program—that Beijing has publicly revealed as designed to close the gap between China and the West in such key technologies as space, composite and new materials, advanced manufacturing processes, and information systems.

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[19] James C. Wilson, "The Chinese Air Force: Roadblocks to Modernization," *United States Air War College*, May 1990, pp. 5-6.

[20] Far Eastern Economic Review, 6 September 1990, p. 20.

[21] Jane's Defense Weekly, 19 November 1988, pp. 1285-1286.

[22] "Radar ECCM's New Area: Anti-Stealth and Anti-ARM", Dianzi Xuebao, March, 1987; "China Considers Carrier Plans", Jane's Defense Weekly, 16 June 1990, p.1186.

VI. PROSPECTS

Senior military leaders are likely to continue to press Beijing to increase budgetary support to the PLA throughout the 1990s, arguing that such funds are long overdue and essential to improving morale and maintaining loyalty, meeting operational expenses, and financing weapons modernization. An analysis in China's prestigious journal *Economic Research* on 20 June 1990 is probably a reflection of this pressure. Its author argues that the state must increase its defense allocation at a rate comparable to national economic growth for several years to offset a decade of declining military spending. Otherwise, the author warns that defense modernization will be held up and the livelihood of China's officers and men will become more difficult, resulting in lax discipline and a decrease in the PLA's combat effectiveness.

In arguing for morale-boosting programs, China's military leaders are likely to play on Beijing's current sense of vulnerability over the loyalty of the PLA. They will probably succeed in obtaining higher levels of funding for items designed to improve living standards, such as housing and food subsidies. Meanwhile, Beijing will probably face mounting operational expenses over the next few years to meet the costs of expanding the police and security presence in Beijing and other key cities. Maintaining or expanding a presence in remote border regions, including Tibet and the Spratly Islands, is also likely to pose an increasing drain on military resources for the foreseeable future.

Although the military is in a strong position to press for more funding because the leadership depends on it for continued rule, some interest groups within the leadership may argue that a greater emphasis on defense is unwise given the faltering state of the Chinese economy and the diminished Soviet threat. They can, for example, point to Gorbachev's announced force reduction of over 200,000 men from the Soviet Far East by next January and the withdrawal of Soviet divisions from Mongolia as well as the reduced border tensions with Vietnam and India. Much may depend, therefore, on the relative influence of the PLA within China's leadership.

In summary, the increase in defense spending in 1990 reflects both real needs caused by the neglect of the military during the economic growth of the 1980s and the increased reliance of the leadership on the military. It is likely that the leadership will feel compelled to try to assuage the military by increasing defense spending over the next few years to ensure military readiness to quell potential domestic unrest. The remaining question will be how much of China's defense spending comes from the official budget and how much is financed from other sources. In either case, the key issue will probably be not if defense spending will grow in the next few budgets, but how much.

CHINA IN TRANSITION: MILITARY CONCERNS AND ABILITY TO INFLUENCE EVENTS

By Ronald N. Montaperto *

CONTENTS

	Page
I. Introduction	685
II. The Chinese People's Liberation Army: Sources of Political Influence	686
A. June 4, 1989: The Impact of Tiananmen	686
B. Experience and Personal Relations	686
III. Changing Patterns of Political Influence: The Impact of Professionalism	687
A. Commanders and Operators	689
B. Technocrats	689
C. Strategists	690
D. The Political Commissariat	691
IV. Professionalism and PLA Unity	692
V. Issues of Concern	692
A. The Succession	692
B. The Budget and Acquisitions	693
C. Foreign Relations	694
D. Social Policy	694
VI. Conclusions	695

I. INTRODUCTION

China has entered the twilight of the Deng Xiaoping era of reform and openness. In 1991, age, infirmity, and the passing of its members will undoubtedly lead to the deterioration of the uneasy leadership coalition that has ruled China since the events at Tiananmen Square in June 1989.

The Chinese People's Liberation Army (PLA) will be deeply involved in the effort to achieve a smooth succession and shape the course of future policies. Some national military leaders—both retired and on active duty—will be direct participants in the process while nearly all will closely monitor the full range of Beijing's policies and attempt to influence those that bear upon military interests.

Their ability to achieve success will be affected by the reality that the PLA too is experiencing a period of institutional transition that influences most aspects of its activities. For example, the basis of PLA political power is beginning to change and the focus of military political concern is becoming more narrowly focused. Also, the means by which the army strives to achieve its political goals is beginning to reflect a new and increasing reliance on formal institutions and regularized procedures. Networks of personal relations—

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* Defense Intelligence Agency.

guanxi networks—are being supplemented by formal institutional relations. This essay analyzes and describes changes in the patterns of PLA political influence and speculates on the ways in which that influence is likely to be used in the immediate succession period and beyond.

II. The Chinese People's Liberation Army: Sources of Political Influence

A. JUNE 4, 1989: THE IMPACT OF TIANANMEN

The suppression of the Democracy Movement illustrates vividly the loyalty of the PLA to Deng Xiaoping and the senior Party leadership. Despite some misgivings, and probably mindful of the cost to be paid in terms of morale, the army as an institution responded to Deng's call, routed the Beijing demonstrators, and upheld China's leaders in the face of the challenge to their authority.

The PLA's role in suppressing the Tiananmen demonstrators does not appear to have produced an increase in the army's formal institutional power. Since June 1989, the PLA role in supervising the media may have become more active and the continuing campaign to learn from Lei Feng has certainly raised the visibility of the military. Overall, however, the proportion of military personnel serving on various Party and government organs remains basically as it was before the events at Tiananmen.

On the other hand, it is reasonable to assert that the informal political influence of individual senior military leaders has probably grown since the summer of 1989, if only because the challenge of the democracy demonstrations increased the need for military support. In the mind of the civilian leadership collective, maintaining social stability, and, especially, preventing new outbreaks of demonstrations, requires that the populace view the PLA and the People's Armed Police (PAP) as reliable, dedicated supporters of the Party and government. The need to maintain the loyalty of the leaders who control the military and police apparatus therefore remains intense and their opinions are likely to loom large in certain types of policy deliberations throughout the succession period. This is one source of military influence in the current political environment.

B. EXPERIENCE AND PERSONAL RELATIONS

Apart from their control of military force, senior PLA leaders are also guaranteed authoritative participation in the larger political process by virtue of the symbiosis that exists between them and China's senior civilian leaders. To illustrate this, a brief excursion into Chinese Communist history is necessary.

As the concept of "People's War" evolved between 1935 and 1949, CCP emphasis on the political functions of conflict, the corollary doctrine of strict military subordination to the Party, and the shared difficulties of an arduous wartime environment caused a blurring of the distinction between civilian and military leaders. As a result, there grew up a class of revolutionary leaders, such as Deng Xiaoping, Li Xiannian, Nie Rongzhen, and many others whose abilities, achievements, and reputations transcended the boundary between the civilian and military sectors. After 1949, some, like Deng, returned to their essentially civilian roots while others, like Nie, remained in uniform.

However, in subsequent years, the relationships continued and, in many cases became stronger. Throughout China's post-1949 history, what is now the older generation of military leaders has derived added lustre from its close association with China's present senior civilian leaders. The civilians too, both individually and as a group, have gained additional strength from their relations with senior military leaders.

Even though age, declining physical capabilities, and actuarial attrition are gradually eroding the ties, the symbiotic relationship in which the members of each group use the members of the other as political resources continues to exist. As a result, even though the PLA is institutionally subordinated to the Party, its senior leaders possess a degree of political access and influence exceeding that mandated by their formal positions. Their status as old-line revolutionary heroes legitimizes their claim to speak on issues of broad policy.

Few of these senior military leaders remain on active duty, although Defense Minister and Politburo member Qin Jiwei and Central Military Commission Vice Chairman Liu Huaqing continue to hold official office. Most, such as former PLA General Staff Department Director Yang Dezhi and General Political Department Director Yu Qiuli retired from the service. Insofar as the retired PLA leaders have a common institutional locus, it appears to be in the Central Advisory Commission (CAC). More than two thirds of the members of the CAC are either active or retired military personnel.

The objections of senior military leaders may well have been one of the factors that prevented Hu Yaobang's accession to the Chairmanship of the Central Military Commission and also an important cause of his dismissal from the post of Party General Secretary. If so, it shows that senior military leaders are able to utilize the influence that accrues from their status to achieve favorable action on a variety of issues related to PLA interests or to problems of national policy. Indeed, the influence derived from the considerable status of its retired and active senior leaders probably remains as the most important link between the PLA and the larger political system.

However, with the decline and gradual passing of the older military generation, the sources of status within the PLA and therefore the nature of the military leadership in China is changing. So too are the linkages between the PLA and the larger political structure and the basic manner in which the army articulates the full range of its political concerns. To illustrate how this is so, it is necessary to turn to a consideration of the impact of rising military professionalism.

III. Changing Patterns of Political Influence: The Impact of Professionalism

In 1985, the reduction in the size of the force, the implementation of a significantly improved education and training system for officers, and a force-wide reorganization into group armies signaled that the PLA quest to build a modern, professional army had reached a new stage. However, it is important to note that the vision of the professionalism that was to be achieved appeared to be solidly grounded in the Chinese notions of democratic centralism. Like "socialism," "military professionalism" in China was to have uniquely Chinese characteristics.

In the context of Chinese Communist history and values, military professionalism does not require that the PLA withdraw from active participation in either the political or social systems. As the PLA becomes more "professional" the nature of the political issues on which the army is engaged is shifting and becoming more narrowly focused on military matters. As noted above, professionalism is also producing a new type of leader. Advancement and status is coming to be based upon command of specialized knowledge and expertise rather than on historical experience and revolutionary associations. Finally, professionalism is producing a style of engagement that is more intense than was generally so in the past.

The shift in orientation became evident after the Cultural Revolution when the army began its move "back to the barracks." By 1987, PLA representation was reduced from 57 percent to 11.1 percent in the Politburo, from 31 percent to 18.6 percent in the Central Committee, and from 29.5 percent to zero of Provincial First Party Secretaries. Eight military officers who served as heads of machine industrial industries had been replaced by 1980. For the PLA, the "back to the barracks" movement signaled a shift from performing government and Party-centered administrative and supervisory functions to building a modern fighting force.

In addition to shifting the focus of political concern and encouraging the emergence of a different kind of leader, professionalism is also posing a new challenge to the coherence of the PLA as an institution. Modernization necessitates acquiring sophisticated weapons technologies, developing the new fighting doctrines and the training patterns to use them effectively, and managing relations with foreign military establishments. This in turn requires leaders who have mastered the new skills and gained the expertise required to perform these functions.

It seems apparent that such a group of technocrats and commanders is emerging and that the new leaders are beginning to define PLA political interests in ways that increasingly focus on coaxing from the political and economic systems the resources and supports required to modernize the military. The new leaders have also begun to articulate their professional concerns at the highest levels of the military and civilian bureaucracies.

In the context of scarce resources, the demands of the leaders responsible for nurturing different aspects of professionalism and modernization are often conflicting, and the process of brokerage by which competing claims are reconciled assumes the aspect of a zero-sum game. Officers with similar orientations and priorities draw together and use connections with officers at higher levels to promote their common interests.

As a result, the rise of military professionalism in China is also producing new constituencies within the PLA as well as the new-style leaders to represent them. Competition for resources within and between the different PLA groupings will continue to grow and, overall, the process by which the military engages the larger political system will become more difficult to define. Most important, the basis for rising to the higher levels of the PLA leadership is beginning to change as the specialized expertise of the generation concerned with building professionalism combines with and begins to replace the more general revolutionary experience of the Long March generation. As with China's civilian institutions and leaders, the PLA too is in the midst of a succession process.

For heuristic purposes, it can be asserted that four main constituencies seem to be emerging. The categories are neither logically exhaustive nor mutually exclusive. Moreover, because all share similar historical roots, the boundaries between them are not firmly fixed and indeed transcend the more traditional divisions between the ground, naval, and air components of the force. Additional groupings almost certainly exist, but those discussed below are the most useful for a preliminary analysis of the changing political role of the PLA.

A. COMMANDERS AND OPERATORS

Potentially the most politically powerful of these constituencies is a group of men who serve or who recently have served as commanders of different group armies or as leaders within the military science and technology establishment. Their political influence derives from several sources.

First, although they have yet to achieve the highest rank, these officers are able to use connections with their superiors at the military region and national levels to articulate their professional concerns which, by definition, center on the capabilities of the group armies to perform their basic military missions. Second, because they compel attention to these basic needs and requirements, the inputs of the group army commanders are central to defining PLA demands for resource allocation, and the social supports that facilitate maintaining training programs and morale. These inputs also justify the flexibility necessary to implement new doctrinal formulations. Third, the group army commanders are able to supplement their essentially indirect sources of influence by direct participation in certain aspects of the formal political process at the national level; they and the younger commanders within the various military regions comprise roughly one half of the total military representation on the Chinese Communist Party Central Committee. Finally, the members of this group will replace the old guard as that generation passes from the scene. One such individual is Li Jijun, who formerly commanded the 38 Group Army and who now works in the General Office of the Party Central Military Commission. Li is also a member of the Party Central Committee.

B. TECHNOCRATS

A second group is located squarely within the science and technology establishment and its members often are connected with the network of companies controlled by the Commission on Science, Technology, and Industry for National Defense (COSTIND) or with those associated with the General Staff, General Political, and General Logistics Departments at the PLA national level. Technocrats, scientists, and engineers rather than professional soldiers, these colonels and generals have an interest in acquiring both whole systems and the technologies required for indigenous programs of weapons development. They also form an important part of the interface between the PLA and foreign armies.

The highly-educated technocrats are important, not only because of the obvious significance of their concerns for the future of the PLA, but also because, in many cases, its members are either related to or have very close personal relations with China's highest civilian leaders. These connections mean that they are extraordinarily well-positioned to ensure a hearing for their interests and plans in national political councils. In terms of function, the technocrats recommend priorities for acquiring advanced foreign technologies, coordinate the research and acquisition plans of the army, navy, and air force, and manage the military dimension of China's opening to the outside. It is probable that the members of this group strongly advocate a broad and active PLA engagement with foreign military establishments and the aggressive pursuit of foreign military sales. Lieutenant General Ding Henggao and Major General He Pengfei are examples of the members of this constituency.

C. STRATEGISTS

Although it was truncated by ten years of Cultural Revolution emphasis on Maoist conceptions of People's War, the PLA actually possesses a rich tradition of critical writing on strategy and doctrine. The recent revival of this tradition appears to have produced a third constituency that is concerned with formulating the strategic concepts intended to guide the PLA into the 21st Century.

This group is located within a network formed by the National Defense University, the Academy of Military Sciences, and such think tanks as the Chinese Academy of Social Sciences. The strategists appear to be a more fluid group than the two mentioned previously and probably also have less coherence than the others. Its members appear to arise from the division command level and below and probably cycle through the various schools and institutes as part of the new pattern of career development that has emerged in the 1980s. However, a small number remain to become permanent members of the defense intelligentsia.

Although the strategists appear to have little direct influence in the larger political process, they are important in two respects. First, they articulate the concepts that help to define China's strategic assessment and thus influence the ordering of national priorities. Second, and following from the first, they appear to have influence in establishing priorities for developing future military capabilities. For example, China's recent emphasis on building the capabilities necessary to prosecute so-called local wars of limited duration is probably based upon the work of this group. Finally, the strategists define and execute the terms of reference for the enhanced system of military education that has become so important for the PLA. They help to form the mindset of future PLA leaders.

D. THE POLITICAL COMMISSARIAT

Ten years of military reform do not appear to have produced a synthesis of the longstanding dialectic between "red" and "expert." The tension between the two concepts will probably continue for as long as "the People's Army" exists. For that reason, the PLA's political commissars will continue to function as a critically important constituency.

The most immediate effect of rising military professionalism after the changes of 1985 was to sharply reduce the proportion of time devoted to political study and training. However, the 1987 appointments of Chi Haotian, Yang Baibing, and Zhao Nanqi, all of whom had long experience as political officers, to head the PLA General Staff, General Political, and General Logistics departments illustrated the continuing importance and vital role of the political commissariat, both within the PLA and as a voice to be heard as the PLA formulates its position on important national political issues.

Under their leadership, the role of the political officer appeared to focus on easing the stresses and strains engendered by the reorganization and force reduction. Political officers explained the rationale for the new policies, performed liaison functions with local government organs and enterprises to help the transition of the retirees to civilian life, and saw to maintaining the morale and quality of life of the troops who remained on active duty. The overall message appeared to be that participation in the military modernization process was in itself a political value of major importance.

However, since Tiananmen, apprehension about the political reliability of the force has brought a dramatic increase in the influence of Yang Baibing's General Political Department and in its influence at all levels of command. Political study now occupies more than half of total training time. At the same time, having adopted a "correct" stand on the PLA role in suppressing the Tiananmen demonstrations appears to be a major consideration as the General Political Department and political commissars at all levels vet candidates for promotion. As a result of Tiananmen, the pendulum within the military appears, as was the case after 1959 and during the Cultural Revolution, to have swung towards the political commissariat.

At the national level the locus of influence for the political commissariat certainly resides with Yang Baibing who, in addition to his role as Director of the General Political Department, is also General Secretary of the Party's Military Commission and a member of the Party Secretariat. Through his half-brother, President Yang Shangkun, and also by virtue of his wide-ranging dominance of the PLA's political commissar system, Yang is able to press the case for ideological correctness, maintaining the primacy of the Party over the army, and for maintaining political stability. It is probable that Yang's primacy, and with it the ascendancy of the political commissariat, will obtain at least until the larger issues of the succession are resolved. Moreover, traditional military conservatism on social and political issues will be reenforced for a time.

IV. PROFESSIONALISM AND PLA UNITY

In the short run, the emergence of new PLA constituencies will pose some challenge to military unity. For example, the dominance of the political commissars will eventually spark the resistance of other constituencies that are deeply concerned with readiness, equipment acquisition, and training.

However, over the longer term, it is not likely that the competition of the new constituencies will seriously degrade overall PLA unity. Longstanding PLA values emphasize loyalty to the civilian Party leadership and the concept of the PLA as the guardian of China's national security. These values provide a strong incentive to achieve compromise.

Also, as mentioned earlier, the military elders derive a large measure of their political power and influence from their ability to mobilize military support for civilian leaders and because they can ensure a hearing for military concerns. To do this effectively requires that the PLA speak with one voice. Accordingly, the prestige of the military old guard is used—sometimes even by younger officers—to forge consensus before potential conflict becomes disruptive. PLA advocates are under some pressure to compromise their positions in accordance with the preferences of their senior patrons.

As the military elders pass from the scene, a new mechanism for consensus building will have to be found. However, for some time to come, the PLA will on the whole continue to speak with one voice on the larger issues of national policy.

V. ISSUES OF CONCERN

Overall, the PLA's political priorities for the future will probably be determined by two overarching considerations. First, and ultimately more important, the PLA will desire to restore, and, if possible, to increase the momentum of its equipment modernization program. Second, and of more importance in the immediate future, will be the desire of the military to maintain a stable social and political environment.

These concerns will frame and influence the PLA's approach to political engagement on other issues that hold a different level of importance. Because the world view of China's highest military leaders seems to mirror the ideological conservatism and nationalistic bias of their civilian counterparts, the army will probably continue to support the present civilian leaders. However, the constancy of military support will obviously be conditioned by the perception of how well the civilian leaders manage China's pressing economic and social problems and, of course the extent to which the civilian leaders support the military modernization effort.

A. THE SUCCESSION

In keeping with established practice and convention, it is most likely that PLA succession concerns will be articulated mainly by the military elders in combination with the members of the Party Military Commission and the officers who serve on the Party Central Committee and its Politburo. These men will represent the views and preferences of the lower command levels who will not become directly involved.

At this time, the senior PLA leadership appears to support the combined leadership of Party General Secretary Jiang Zemin and Premier Li Peng. However, judging by the pattern of military response to the events at Tiananmen, their support is probably rooted in the personal loyalty that senior leaders hold for Deng Xiaoping. If Deng should suddenly pass from the scene, or if he were to become incapacitated, continued military support for Jiang and Li is by no means assured.

When the attrition of the senior leadership begins, the PLA will probably use all of its considerable resources to reduce the tensions the transition is bound to produce. As noted above, senior military leaders will work through established, although informal and highly personalized, channels to assure a smooth transition.

President and Military Commission First Vice Chairman Yang Shangkun will perforce be a key player in this process, assuming he remains in good physical and political health. With his more than sixty years of Party and military experience, Yang seems well-positioned to play the leading role. However, he also faces a number of difficulties. For example, despite his revolutionary credentials and military associations, he simply lacks Deng's stature. Also, having made his mark as a bureaucratic administrator, he is not a soldier in the same sense as China's other senior military leaders.

Given what appears to be an almost universal acknowledgement within the high military and civilian leadership of the need to maintain an atmosphere of continuity, direct military intervention involving either the threat or actual use of force does not appear to be very likely. However, if succession politics produces a prolonged stalemate, and if new outbreaks of demonstrations occur, military concerns about stability will rise.

Even then, it is most likely that the People's Armed Police will be responsible for dealing with popular demonstrations. However, PLA leaders at all levels will monitor events quite closely. If stalemate and or unrest continues, PLA leaders will become more assertive and eventually align themselves with the group they feel will bring stability and a program that supports PLA modernization interests. This is the point at which support for Jiang or Li, or both, could be withdrawn.

B. THE BUDGET AND ACQUISITIONS

Given its strong commitment to restoring the momentum of the modernization program, and irrespective of the additional funds that might be available from other, "off-budget" sources, the PLA will undoubtedly continue to press for increases in the overall defense budget. The recent 15.2 percent increase in defense expenditure to 28.97 billion yuan, while highly welcome, cannot but be regarded by PLA modernizers as anything other than partial compensation for nearly a decade of gradually shrinking support. Overall, the increase has probably accomplished little more than to whet the appetite for additional funding.

The desire to overcome the deficiencies resulting from these shortfalls is the major impetus driving PLA efforts to develop a modern, professional force. Senior military leaders will attempt to use their influence, which has been bolstered by the PLA defense of the Party in June, 1989, to support demands for increased funding. However, China's overall economic situation appears to be such that the economy will not be able to sustain military budgets at the level demanded until well into the future. The resulting tension will test the ability of the system to produce a satisfactory compromise. It will also be a continuing problem for any successor regime.

C. FOREIGN RELATIONS

In foreign relations, most senior PLA leaders appear to share the essentially conservative, nationalistic world view of their counterparts. The views of leaders at the military region and below are less clear, but they probably agree with their senior colleagues and patrons. Consequently, it is likely that PLA leaders will continue to support China's "opening to the outside" and press for expanded military and defense relations with the west and Japan, but simultaneously uphold the policies designed to counter the spread of "bourgeois liberalism."

The intense nationalism of military leaders appears to produce an ambivalent view of the proper course for China's foreign relations. PLA leaders apparently recognize that broadly defined diplomatic and economic ties with the external world are essential to the economic, scientific, and technological development required to provide a firm foundation for China's national security. They particularly value foreign military contacts as a source of modern weapons and for the stimulation they provide in developing and adapting their own military doctrines.

However, these reasons for expanding external relations tend to be offset by an innate suspicion of foreign ideas and concepts. The end result is that, while PLA leaders will continue to support expanding bilateral relations—especially with the west and Japan—they will also insist the relationships not become what they consider to be too close.

D. SOCIAL POLICY

Through the succession period and into the future, it is likely that the PLA leadership will continue to try to exert a conservative influence on all aspects of Chinese social policy. Since the early 1980s, military leaders have frequently voiced dissatisfaction with various aspects of reform and openness because, in their view, the policies subvert socialist values. Such allegations reportedly formed and important dimension of PLA opposition to both Hu Yaobang and Zhao Ziyang.

Moreover, the PLA appears to be playing an active role in the present effort to inculcate orthodox political values. Since June, 1989, PLA personnel are reported to be active in managing the policies of *People's Daily* and the party theoretical journal *Qiu Shi*. Sensitive as they are to currents in Beijing, provincial media officials have been quick to fall into line between the PLA-inspired exponents of orthodoxy.

Although they will probably support reform and openness for the professional benefits they bring, PLA leaders are also likely to maintain a fairly narrow view of ideological acceptability. If the succession produces a leadership that is more reform-minded than the present coalition, the PLA voice on social matters is likely to become increasingly strident.

VI. Conclusions

The leadership succession and economic problems facing China in the 1990s will frame PLA concerns and the capacity to influence events and national policies. The PLA will be less able to express its professional concerns and promote its professional efforts effectively until overriding issues of national leadership and policy direction are resolved.

Also, the PLA's strongly felt desire for modernization and higher levels of professionalism will compel the military to use its political strength to achieve the political stability and economic progress that will eventually make modernization possible. Yet the demands of building professionalism will continue to conflict with some of the PLA's more traditional political and social roles. For all of these reasons, it is likely that the overall modernization effort will progress only slowly and that accommodating PLA interests will continue to be a nettlesome problem for any successor regime.

Third, there is little prospect of complete withdrawal of PLA support for whatever political combination emerges in Beijing. Debates on leadership, budget allocations, foreign policy, and the proper role of ideology will all intensify through the succession period and probably continue through the decade. PLA positions on these issues are likely to be less flexible and more conservative than those of some civilian leaders. However, because PLA and civilian leaders are motivated by generally similar values, and because these values actually require military access to the larger political process, it is likely that future political leaders will remain sensitive to military concerns across the board, but not be dictated to by a unified military voice.

Finally, the PLA will undergo significant change. The emerging constituencies within the PLA and the parochialism it will inevitably entail will at times cause the army to appear divided. But, to the contrary, the long range effect of building more specialization into the PLA system will increase unity by making each constituency aware of the others' needs and positions. This heightened awareness will probably encourage coherence and cooperation on key issues that address overall PLA requirements.

CHINA'S ARMS SALES: OVERVIEW AND OUTLOOK FOR THE 1990S

By Shirley Kan *

CONTENTS

	Page
I. Introduction	696
II. Historical Summary of Chinese Arms Sales	698
A. Role of Arms Sales in China's Exports	698
B. Pakistan	698
C. Egypt	699
D. Iraq and Iran	700
E. Saudi Arabia	701
F. Cambodian Resistance	702
G. Thailand	702
H. Myanmar (Burma)	703
III. Implications	703
A. Geopolitical Effects	703
B. Relationship to Internal Reforms	704
C. Modernization of the Military	706
D. Interdependence in the World Economy	707
IV. Outlook for the 1990s	708
A. Internal Factors	708
B. External Variables	709
V. Conclusion	711

TABLES

1. Ratio of Arms Exports to Chinese Total Exports	699
2. China's Arms Trading Corporations	705

I. INTRODUCTION

In the last decade, China emerged as a major supplier in the international arms market, especially in the strategic Mideast region. The transfers of low cost and low technology Chinese weapons have been exclusively to the developing world. For the 1982–1989 period, China ranked fifth in terms of arms deliveries to developing countries—behind the Soviet Union, United States, France, and the United Kingdom. Moreover, Chinese arms deliveries increased 37 percent from the 1982–1985 period to 1986–1989.[1]

The Chinese have reaped economic, political, and other benefits from their arms sales. By marketing primarily to the Mideast, China's state-run arms trading corporations have collected enormous profits from Egypt, Iraq, Iran, and Saudi Arabia. Geopolitical

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[1] Grimmett, Richard F. *Trends in Conventional Arms Transfers to the Third World by Major Supplier, 1982-1989.* CRS Report 90-298F, June 19, 1990. Table 2F.

motivations have continued to play the most important role in decisions on weapons shipments to countries outside of the Mideast region. China has provided weapons to Pakistan, Cambodian guerrilla factions, Thailand, and Myanmar's regime. Beijing has used this policy to increase China's political leverage in Asia and to help check feared Soviet, Vietnamese, and Indian expansion. China has earned influence through its contribution to the arms buyer's efforts in addressing regional balance of power situations or internal political struggles.

Technological, intelligence, and diplomatic benefits have also motivated China's enthusiastic pursuit of arms sales. Two arms buyers, Egypt and Iraq, reportedly provided Chinese defense researchers with Soviet equipment, allowing them to extract technology more advanced than China possessed. These Middle Eastern buyers also probably furnished intelligence about Soviet weaponry and military doctrines.[2] Furthermore, China's arms sales to Saudi Arabia helped pave the way for Riyadh's recognition of the People's Republic on July 21, 1990—a major diplomatic victory for Beijing at the expense of the Nationalists on Taiwan.

China's increased arms sales have important ramifications for world stability. Attempts at global conflict management or weapons non-proliferation now requires cooperation from Beijing. In other words, Chinese behavior conditions to an unprecedented degree the ability of the superpowers to manage world events, such as a Cambodian peace settlement and the Iraq-Kuwait crisis. In addition, economic and technological benefits from arms sales have contributed to Chinese military modernization—an important ingredient in China's status in world affairs.

Arms sales also have important implications for China's efforts at reforms, modernization, and interdependence. Within the defense industrial establishment and the People's Liberation Army (PLA), an entrepreneurial sector with a significant stake in China's reforms and foreign contacts has developed. The arms trade has contributed to both the short-term aim of incremental upgrading of military hardware, as well as the long-term objective of strengthening the defense research and development base. On the other hand, the aggressive commercial marketing of arms has called into question China's commitment to global weapons non-proliferation and stability. U.S. charges of irresponsible behavior in arms transfers have hampered Beijing's efforts to promote foreign technology transfers.

In the 1990s, China can be expected to continue arms sales with vigor, in order to further advance its position as a world power and pursue foreign currency earnings, but these efforts will probably be tempered by external factors. The internal factors influencing Chinese arms sales will be leadership goals, political requirements, bureaucratic compromises, industrial capability, as well as military requirements. External variables include changes in the international arms market, regional instability, the nature of superpower relations, China's security situation, and economic and technological leverage on the part of countries or world organizations in restricting weapons transfers. At times, policy-makers in Beijing must choose between benefits of Western linkages and gains from arms sales, and between military and civilian production needs. Overall, Beijing's pursuit of sustained or increased arms sales will be circumscribed by the continuing decline in demand for arms, greater emphasis on nuclear and conventional weapons non-proliferation in wake of the Cold War, and the resolution of tensions along China's borders with the Soviet Union, Vietnam, and India.

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[2] Shichor, Yitzhak. "The Middle East," in Gerald Segal and William Tow (eds.). *Chinese Defence Policy*. London, Macmillan Press, 1984. p. 271–2.

The next section will review the significance of Chinese arms sales and the major weapons deals. Then, the ramifications for world politics, and the implications for China's reforms, modernization, and interdependence will be summarized. Finally, the last section will cover the internal and external factors which will influence the prospects for Chinese arms sales in the 1990s.

II. Historical Summary of Chinese Arms Sales

In the decades prior to 1980, due to both Maoist outlooks and market conditions, China's goals in weapons transfers did not include commercial profits. Military aid was provided on a grant basis, and the modest levels amounted to less than $5 billion between 1963 and 1980. For strategic interests, the Chinese furnished military supplies to North Korea, North Vietnam, Pakistan, Tanzania, and different insurgent groups.[3]

In the 1980s, several internal and external factors encouraged China's eager pursuit of arms deals for foreign exchange earnings. China's new pragmatic leadership under Deng Xiaoping perceived a reduced security threat and emphasized an economic development role for the military. The Chinese policy-makers established foreign trading corporations in the various defense industrial ministries and the PLA. Opportunities surfaced when oil-rich, high-demand markets emerged in the Middle East, especially with the start of the Iran-Iraq War.

ROLE OF ARMS SALES IN CHINA'S EXPORTS

Chinese arms sales have become an important foreign exchange earner. Although the Chinese Ministry of Foreign Economic Relations and Trade does not report statistics on military sales,[4] the ratio of arms exports to total Chinese exports can be estimated, as provided in Table 1 below. The contributions of China's arms exports to total exports during the 1980s were significant relative to the ratios in other countries.

PAKISTAN

Neighboring South Asia was one of the first arenas where Beijing employed arms transfers to further Chinese interests, and Pakistan has been key to China's geopolitical strategy regarding India and the superpowers since the 1960s. Following serious deterioration in relations between Beijing and Moscow, the Sino-Indian

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[3] Joffe, Ellis. *The Chinese Army After Mao*. Cambridge, MA, Harvard University Press, 1987. p. 114.

[4] Fletcher, Noel. "China Talks More Openly About Plans for Arms Sales," *Journal of Commerce*, Oct. 4, 1988.

TABLE 1. Ratio of Estimated Arms Exports to Total Chinese Exports

Year	Arms Deliveries (millions of US$)	Total Exports (millions of US$)	Arms Deliveries as a Percentage of Exports (%)
1983	1,560	26,542	5.9
1984	2,060	30,784	6.7
1985	670	30,311	2.2
1986	1,250	31,933	3.9
1987	1,800	41,947	4.3
1988	2,580	49,961	5.2
1989	1,950	51,667	3.8

Sources: Value of Arms Deliveries from Richard Grimmett, *Trends in Conventional Arms Transfers to the Third World by Major Supplier, 1982–1989*, Congressional Research Service, June 19, 1990. Table 2.

Figures for Total Exports based on merchandise exports plus other goods, services, and income credits in *International Financial Statistics* (IMF, September 1990); and adding the value of arms deliveries for each year to IMF total, because the Chinese Ministry of Foreign Economic Relations and Trade does not include arms sales in its statistics.

border war of 1962, and India's subsequent military build-up with Soviet assistance, Beijing committed support to Islamabad's conventional and nuclear defense.[5]

In pursuit of mainly strategic goals, China has continued its contribution to Pakistan's efforts to build its defense in face of India's military acquisitions. Over 1978–1982, the value of Chinese arms deliveries to Islamabad was $230 million (in constant 1984 dollars), and during 1983–1987, that value was $270 million (in constant 1988 dollars). In the more recent period, Beijing became Islamabad's most important arms supplier after Washington.[6] Willingness to ally with Pakistan in maintaining the local balance of power has earned Chinese leaders their cherished influence in this region for decades. China's role may grow in relative importance as there have appeared signs of weaker American commitment to providing aid for Pakistani defense over concerns about its nuclear capability.

Pakistan is not exempt from the general desire on the part of developing countries to acquire sophisticated Western equipment. The attractiveness of the outdated Chinese models is chiefly their low cost. Pakistan must make up for the technological disadvantage of these items by installing Western avionics systems. Still, in 1989, Islamabad's air force accepted 50 F7P fighters from Beijing, adding to the existing inventory of 300 Chinese jets. Moreover, the Pakistani navy is negotiating the purchase of a Chinese Han class nuclear-powered attack submarine for $63 million to match India's acquisition of a Soviet Charlie class submarine in 1989.[7]

EGYPT

While the Chinese arms transfer policy in South Asia has been marked by continuity, China's relations with the Middle East experienced astonishing transformation in the 1980s, catapulting Beijing into a position of significant influence in that strategic region.

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[5] Vertzberger, Yaacov. "South Asia," in Gerald Segal and William Tow (eds.) *Chinese Defence Policy*. London, Macmillan, 1984. p. 248–50.

[6] United States Arms Control and Disarmament Agency. *World Military Expenditures and Arms Transfers (WMEAT)*, 1984, 1988.

[7] Cheung, Tai Ming. "Air Arms Race Builds Tensions," *Far Eastern Economic Review (FEER)*, Feb. 15, 1990. p. 54–55; and "Nuclear Deal on Han," *FEER*, Sept. 6, 1990. p. 20–21.

The initiation of Sino-Egyptian military ties was announced by then President Sadat in March 1976, just ten days after he had broken relations with Moscow. The circumstances allowed China to play a valuable role in providing supplies of MiG engines, spare parts, ammunition, maintenance for Soviet-made equipment, and Chinese versions of Soviet MiG aircraft. However, the value of military transactions was low and the deals were part gift, part sales. Chinese arms transfers to the Middle East during the 1975–1979 period were limited to about $70 million, or 0.2 percent of the total military supply to the region.[8]

In 1980, pragmatic Chinese leaders began to provide more significant levels of arms to Egypt on commercial terms. From 1980 to 1983, Beijing concluded deals with the Egyptians valued at the time as something between $500–700 million by one scholar. The writer also notes that China had become Cairo's third largest weapons supplier—after the United States and France.[9] During 1983–1987, Beijing exported $550 million in arms to the Egyptians.[10]

Apart from the economic and political benefits of the relationship with Cairo, Beijing also gained access to more sophisticated Soviet—and perhaps even Western—military technology and intelligence. The more advanced samples of fighters, engines, bombers, missiles, and tanks were not the most up-to-date and may have already been familiar in China. However, the close relationship with the Egyptians was advantageous, because it allowed the Chinese to take back to China working and diversified models with manuals for reverse-engineering and experimentation.[11]

IRAQ AND IRAN

The experience with Egypt gave Beijing confidence in dealing with the next sales opportunity in the Middle East. During 1982–1989, the Chinese made $7.46 billion in arms deliveries to Iraq and Iran.[12] In that period, with 57 percent of its arms shipments destined for the two belligerents, China ranked fifth among all arms merchants to the developing world—behind the Soviet Union, United States, France, and the United Kingdom. As one specialist notes, "the Iran-Iraq War proved to be a bonanza for the PRC, enabling it to sell in the first three years of the conflict more arms than it had exported in the preceding quarter-century." [13]

In spite of its announced neutrality, China had begun to supply weaponry to Iraq in 1981, soon after the start of the Iraq-Iran conflict in 1980. Like Egypt, Iraq lacked Soviet replacement parts and ammunition, and had to turn to China for a quarter of its military acquisitions, including tanks, fighters, light arms, and artillery. Chinese equipment was available without political strings, relatively cheap, simple to use, and could be supplied at an extensive scale. In return, Iraq, like Egypt, probably provided more updated military technological information for China.[14]

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[8] Shichor, p. 264-7.

[9] *Ibid.*, p. 268.

[10] ***WMEAT, 1988.*** p. 113.

[11] Shichor, p. 271-2.

[12] Grimmett, Tables 2G and 2H.

[13] Miller, Morton S. "Conventional Arms Trade in the Developing World, 1976-86: Reflections on a Decade," ***WMEAT, 1987.*** p. 21.

[14] Shichor, p. 268, 272.

In addition, China had exported combat aircraft and other weaponry to Iran—apparently through North Korea—since the beginning of the Iran-Iraq War. By the mid-1980s, China had begun direct shipments to Iran and became its most important supplier of arms.[15] While Chinese arms deliveries to Iraq were valued at $3.11 billion (in 1990 dollars) during 1982–1985, deliveries to Iran were a modest $570 million over the same period. In the 1986–1989 period, the pattern was reversed. China's arms deliveries to Iraq dropped to $1.05 billion, while deliveries to Iran climbed to $2.73 billion.[16]

Reports that Chinese shipments to Iran included Silkworm surface-to-surface missiles which threatened shipping in the Persian Gulf prompted the United States in October 1987 to ban further liberalization of technology sales to China. In response, Beijing announced its intent to "prevent Silkworm missiles from flowing into the international market" while denying direct sales to Iran. In early March 1988, then Chinese Foreign Minister Wu Xueqian visited Washington where he reiterated the vague assurance, without committing support for a U.N. Security Council resolution to impose an arms embargo on Iran. After Wu's statements, the State Department announced on March 9 the resumption of export-control liberalization for China. However, U.S. intelligence found that Beijing had also exported C–801 anti-shipping missiles and CSA–1 anti-aircraft missiles—items not mentioned in the official Chinese assurance.[17]

SAUDI ARABIA

Ironically coinciding with Foreign Minister Wu's visit, the United States, on March 6, 1988, obtained confirmation of American intelligence reports about Chinese deliveries of CSS–2 (East Wind) intermediate range ballistic missiles to Saudi Arabia. Reports indicated that the Sino-Saudi deal was initiated in 1985. The shipments, which first reached Saudi Arabia in late 1987, were reportedly disguised as weapons bound for Iraq.[18] The actual number of missiles sold has not been made public, but the transfer was believed to be sizeable, with the cost to the Saudis estimated at $3–3.5 billion.[19] Indeed, the monetary value of total Chinese arms deliveries peaked in 1988, amounting to $2.58 billion.[20] The sale had serious implications for dangerous missile proliferation in the Middle East.

In addition to significant economic profits, Beijing also scored diplomatic points in its rivalry with Taipei, as Saudi Arabia had been one of the few remaining countries to maintain formal recognition of the Republic of China on Taiwan. The CSS–2 missile sale signaled the development of increasingly friendly Sino-Saudi ties, which culminated in the establishment of diplomatic relations between Beijing and Riyadh on July 21, 1990.[21]

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[15] Van Vranken Hickey, Dennis. "New Directions in China's Arms for Export Policy: An Analysis of China's Military Ties with Iran," *Asian Affairs*, Spring 1990. p. 18; Michael Weisskopf. "China Sells Arms to Iran Via North Korea," *Washington Post*, April 3, 1984.

[16] Grimmett, Tables 2G and 2H.

[17] Van Vranken Hickey, p. 18–19; Chanda, Nayan. "Much to Do About Nothing," *FEER*, March 24, 1988. p. 19.

[18] Ottaway, David B. "Saudis Hid Acquisition of Missiles," *Washington Post*, March 29, 1988. p. A1.

[19] Seib, Gerald F. "Saudi Purchase of Long-Range Missiles Rekindles Debate on U.S. Arms to Arabs," *Wall Street Journal*, April 4, 1988. p. 13.

[20] Grimmett, Table 2.

CAMBODIAN RESISTANCE

While the Chinese have exported arms to the Middle East primarily for monetary gains, in Indochina, Beijing used military instruments as part of a geopolitical strategy toward Vietnam and the Soviet Union. China became a major supplier of weapons to the three Cambodian resistance groups in 1979, after Vietnam's invasion. Most supplies have been channeled to the communist Khmer Rouge, the strongest faction with 30,000–40,000 guerrillas. In addition to the 1979 PLA attack on the Sino-Vietnamese border [22] and continued naval activities in the South China Sea, arms transfers have been one of three military tools employed for Beijing's objectives of a Vietnamese withdrawal from Cambodia and an end to their alliance with the Soviets.[23] U.S officials estimated the Khmer Rouge to have received $100 million a year in military and other support from their Chinese patrons.[24]

During Hanoi's troop withdrawal from Cambodia in 1988–1990, reports said that the Chinese continued to supply large new shipments of arms to the Khmer Rouge.[25] In July 1990, China agreed to halt arms transfers to the guerrilla faction, perhaps to be a more constructive international actor. Beijing's commitment was necessary for U.S. foreign policy objectives. The agreement came a day before Secretary of State James Baker announced that the United States was dropping diplomatic recognition for the resistance coalition and opening talks with Vietnam, in efforts to prevent the Khmer Rouge's return to power.[26] However, in spite of the Chinese pledge, reports in the fall of 1990 have claimed the Chinese may be supplying tanks to the Khmer Rouge in their last grab for strategic territory before the conclusion of peace talks.[27]

THAILAND

As part of its strategy to isolate Vietnam, Beijing has also placed priority on improving ties with the Association for Southeast Asian Nations (ASEAN).[28] China's rise in prominence as the second largest military supplier to Thailand since 1986 was one result of this emphasis. The Thais made the most purchases in 1987 and 1988 from the Chinese, all based on low "friendship" prices, perhaps below cost. The special Sino-Thai military relationship developed as a result of common goals regarding Vietnam's invasion of Cambodia, a Thai military modernization program with limited funds, and a dramatic drop in arms sales assistance from the United States—Thailand's most important arms supplier.[29] According to the latest available figures, Beijing delivered $90 million worth of weapons to Bangkok in the 1983–1987 period.[30]

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[21] Beijing International Service. "Commentary Discusses Ties." in *FBIS-CHI*, July 24, 1990. p. 6.

[22] After Vietnam's invasion of Cambodia in 1978, Beijing sought "to teach Vietnam a lesson" about aggression. The PLA, with its outdated equipment and procedures, failed to achieve a decisive victory in this limited incursion and lost an estimated 20,000 soldiers.

[23] Niksch, Larry A. "Southeast Asia," in Gerald Segal and William T. Tow (eds.). *Chinese Defence Policy.* London, Macmillan, 1984. p. 236–37.

[24] Sterngold, James. "China Faults U.S. Shift on Cambodia," *New York Times*, July 20, 1990. p. A2.

[25] Pear, Robert. "China is Said to Send Arms to Khmer Rouge," *New York Times*, May 1, 1990.

[26] Krauss, Clifford. "U.S. Says China Backs Halt in Weapons to Khmer Rouge," *New York Times*, July 21, 1990.

[27] *The Nation* (Bangkok). "Officer on PRC Logistic Support to Khmer Rouge," in *FBIS-EAS*, October 12, 1990. p. 68; Pringle, James. "Thieves in the Temple," *Washington Times*, November 1, 1990. p. A8.

[28] Niksch, p. 241.

BURMA (MYANMAR)

In Southeast Asia, China has most recently extended its political influence through arms sales to Burma (formerly Myanmar), where a repressive military regime has ruled since September 18, 1988. After violently suppressing pro-democracy demonstrations, the State Law and Order Restoration Council (SLORC)—as the regime is called—came to power isolated from the world democratic community which imposed an embargo and cut off Western supplies of arms. In addition, India expressed its support in September 1988 for the "undaunted resolve of the Burmese people to achieve democracy." India was also the only neighbor to adopt an explicit refugee policy when thousands of dissidents fled SLORC's takeover a week later.[31] The regime seems determined to retain power in spite of the opposition's overwhelming victory in the May 1990 elections and to bolster its military force. For the above reasons, the SLORC may have decided to abandon its former neutrality in the Sino-Indian rivalry and turn to China for arms.

Reports indicate that a shipment of Chinese munitions arrived in Yangon (formerly Rangoon) in August 1990. That delivery appears to be only the beginning of a significant arms deal whereby China would supply Burma with a package amounting to $1.2 billion worth of assistance. Twelve F–6 jet fighters (modified MiG–19) are reportedly scheduled to arrive in December 1990. Other items in the agreement include 60 medium-size tanks, 25 anti-aircraft guns, a number of 120-mm and 105-mm howitzers, six 30-knot patrol boats, twelve F–7 jet fighters (modified MiG–21), a number of shoulder-fired HTM 5–A missiles, and nine armored personnel carriers.[32] China quickly dismissed the reports as "sheer rumor."[33]

III. IMPLICATIONS

GEOPOLITICAL EFFECTS

The pattern of Chinese weapon transfers has important ramifications for international politics. Beijing delivered 91 percent of its arms exports to the Middle East and South Asia in the 1982–1985 period, and 94 percent in 1986–1989. In 1989, China was the most important source of arms for Iran, with deliveries valued at $1.29 billion.[34]

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[29] Stier, Kenneth J. "Chinese Edge Out Americans in Arms Sales to Thailand," *Journal of Commerce*, April 20, 1990.

[30] *WMEAT, 1988.*

[31] *FEER. Asia 1990 Yearbook*. p. 97, 99. India built camps for Burmese dissidents, and its Minister for External Affairs stated that no genuine Burmese refugees seeking shelter in India would be turned back.

[32] A reliable diplomatic source told *The Nation* (Bangkok), reported on Nov. 27, 1990, p. 1; in FBIS–EAS, Nov. 27, 1990. Also see, Lintner, Bertil. "Chinese Arms Supply Suggests SLORC Digging In," *FEER*, Sept. 13, 1990. p. 28.

[33] Hong Kong AFP, Nov. 29, 1990; in *FBIS–CHI*, Nov. 29, 1990.

[34] Grimmett. Tables 2D, 2K.

As a result, Chinese cooperation has become crucial for U.S. interests in the strategic and unstable Mideast region. In the recent Iraq-Kuwait situation, Beijing's actions regarding the trade embargo against Iraq have been one of the most closely monitored aspects of that round of crisis-management. The United States sought reassurances that China would enforce the ban on weapons to Iraq after a British paper, *The Independent*, reported on September 30 that Norinco, a Chinese defense corporation, agreed to supply Iraq with seven tons of lithium hydride, a chemical used for ballistic missiles.[35] Other critical observers have noted the foreign ministry's assurances on halting Chinese arms sales to Iraq, but not arms deliveries.[36]

Arms sales have also provided significant influence for Beijing in Indochina and South Asia. Chinese cooperation in halting arms transfers to the Khmer Rouge is necessary for American efforts to bring about a peaceful settlement in Cambodia and preclude the communist faction's return to power. Chinese military transactions to Pakistan also have particular impact for the arms race in South Asia, especially on the issue of nuclear non-proliferation. Arms sales have gained Beijing valuable leverage in foreign relations.

On the one hand, the important position that China attained in the 1980s produced a more confident and satisfied power on the world stage. On the other hand, Beijing's objective willingness and proven capacity to supply in quality and quantity the developing world's demands for arms, including missiles, has caused considerable concern for weapons proliferation.

RELATIONSHIP TO INTERNAL REFORMS

China's elevated status as a world power has also been closely linked to the contributions of its arms sales to efforts at reforming and modernizing the military and economy in general. While Deng Xiaoping's reform of the defense structure after 1978 made possible the extensive Chinese arms sales of the 1980s, that trade in turn has had ramifications for continuing efforts at military and economic reforms. The Chinese military industrial complex developed features of decentralization of control with a proliferation of arms trading corporations in a dual PLA and ministerial structure (see Table 2 below).

Starting in 1979, with one exception, the pragmatic Beijing leadership established foreign trading corporations under the various defense industrial ministries, such as machine-building and electronics.[37] The expansion of military-related sales abroad prompted the PLA to also set up its own front companies to sell off excess stocks of equipment and secure a share of the foreign exchange earnings from the lucrative arms sales. These export and procurement arms of the military have also directly imported advanced military technology and equipment for the PLA's modernization.

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[35] Sun, Lena. "Chinese Said to Sell Chemical to Iraq," *Washington Post*, October 1, 1990. As usual, the Chinese foreign ministry denied China had violated the trade embargo against Iraq and called the report "totally groundless," adding that "China is a responsible country."

[36] Delfs, Robert. "The Gulf Card," *FEER*, September 20, 1990. p. 19.

[37] U.S.-China Business Council. "China's Military Procurement Organizations," *The China Business Review*, Sept.–Oct. 1989. p. 31.; U.S.-China Business Council files. The North Industries Corporation (Norinco) had been secretly set up in 1973.

Table 2 below shows the Chinese arms trading corporations which were formed under reorganized defense industrial ministries subordinate to the State Council and also under General Departments and service arms supervised by the Communist Party's Military Commission.

Table 2: China's Arms Trading Corporations

CCP Military Commission
(PLA Corporations)

State Council
(Defense Ministerial Corporations)

COSTIND:
- Xinshidai Corporation
- Xiaofeng Technology and Equipment Corporation

GSD Equipment Department:
- Polytechnologies, Inc.
- Pinghe Electronics Co. Ltd.

GSD Communications Department:
- China Electronics Systems Engineering Company
- China Zhihua Corporation, Ltd.

Air Force:
- Lantian Corporation

Navy:
- Xinghai Corporation

GPD:
- Kaili Corporation

GLD:
- Xinxing Corporation

PAP:
- Jingan Equipment Import-Export Corporation

MMBEI:
- China North Industries Corp.
- China National Machinery and Equipment Import-Export Corp.
- China Shipbuilding Trading Co.
- China National Electronics Import-Export Corp.

MAS:
- China National Aero-Technology Import-Export Corp.
- China Precision Machinery Import-Export Corp.
- China Great Wall Industry Corp.
- Beijing Wan Yuan Industry Corp.
- Beijing Chang Feng Industry Corp.
- Chinese Academy of Space Tech.

MER:
- China Nuclear Instrumentation and Equipment Corp.
- China Nuclear Energy Industry Corp.
- Rainbow Development Corp.

Abbreviations:

CCP	Chinese Communist Party
COSTIND	Commission of Science, Technology, and Industry for National Defense
PLA	People's Liberation Army
GSD	General Staff Department
GPD	General Political Department
GLD	General Logistics Department
PAP	People's Armed Police
MMBEI	Ministry of Machine Building and Electronics Industry
MAS	Ministry of Aerospace Industry
MER	Ministry of Energy Resources

Source: Corbett, John F. Jr. and Clinton B. Mullen. *China's Defense Industrial Trading Companies*, Defense Intelligence Agency Reference Aid, VP-1920-271-90, unclassified, September 1990.

Three implications for reforms can be identified. First, the defense sector has also been subject to policies of decentralization.

The growth of civilian and military import/export companies has further decentralized authority over commercial production and sales decisions within the state. In the dual defense industrial structure, PLA corporations have been separate from defense ministerial corporations. These "subordinate but highly autonomous" defense ministerial corporations have also set up their own subsidiaries.[38]

Corporations in the PLA have been formed under all three General Departments: Logistics, Staff, and Political, in addition to those in the People's Armed Police, PLA Navy, and PLA Air Force. However, the absence of evidence pointing to Chinese arms shipments to Iraq in the first few months after the invasion of Kuwait may have indicated that the top leadership in Beijing, at a minimum, retains the reins on politically sensitive arms sales.

The Commission of Science, Technology and Industry for National Defense (COSTIND) was formed in 1982 to ensure the PLA's needs are met. COSTIND coordinates budget allocations, research and development (R&D), and production. However, most defense corporations have not been subordinate to it. Responsible to both the State Council and the Party's Military Commission, COSTIND is supposed to link the military and civilian hierarchies. It has played a coordinating role, as when one company needs the supplies of a factory not under its jurisdiction.

Second, arms sales have generated an increasingly large constituency for reforms and foreign trade within the profit-oriented sectors of both the military and civilian defense hierarchies. High-level cadres have opportunities to obtain top management positions in the lucrative corporations situated in attractive coastal cities. The PLA now includes within its ranks soldiers and political officers who have become professional entrepreneurs. As a result, support has been enhanced for continued economic reforms to obtain funds and advanced technology.

Third, the transfer of some PLA officers to import/export corporations and the sale of excess military supplies have facilitated efforts to streamline the military. The PLA's export of its outdated, surplus stocks of military equipment and spare parts was to complement paramount leader Deng Xiaoping's one million man demobilization to restructure the PLA into a leaner war machine. In sum, export of military supplies has played a role in Chinese reforms to adopt more efficient utilization of military facilities and resources, promoting modernization of the forces.

MODERNIZATION OF THE MILITARY

Chinese military modernization involves two dimensions: the short-term goal of improving the combat effectiveness of forces and the long-term aim of building a scientific and defense industrial base capable of developing the country's own weapons with advanced technology.[39] On the positive side, arms sales have promoted the incremental and ongoing progress in both areas through the infusion of economic profits and advanced technology.

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[38] Latham, Richard J. "China's Defense Industrial Policy: Looking Toward the Year 2000," in Richard Yang (ed.) *SCPS Yearbook on PLA Affairs 1988/89*. p. 85.

[39] Godwin, Paul H.B. "Overview: China's Defense Modernization," in *China's Economy Looks Toward the Year 2000*. Joint Economic Committee, May 21, 1986. p. 133.

The significant levels of foreign exchange earned from arms sales have been a very important source of extra-budgetary revenue for the PLA in funding R&D and procurement of advanced equipment and technology. With only 70 percent of operating expenses in maintaining troops covered by the state budget,[40] the PLA must make up for the rest and still find supplemental funds for modernization. For example, the General Logistics Department's Xinxing Corporation, which has an annual business volume of several hundred million U.S. dollars, has been allowed to keep 100 percent of its foreign currency earnings.[41]

The increased financial autonomy of the PLA provided by arms sales has made ongoing modernization possible in spite of reductions in defense allocations, which dropped from 17.5 percent of national spending in 1979 to 7.4 percent in 1989.[42] Arms sales also apparently gave access to more advanced technology through China's arms buyers in the Middle East. These contributions have allowed the modernization of the PLA through extensive research and development, and less so by large-scale import of more sophisticated equipment.[43] Finally, with reforms aimed at reducing the isolation of the defense research and production sector, technology transfers have stimulated the upgrading of civilian facilities and products as well.

There is an opposing viewpoint that the Chinese arms marketing structure has obstructed the development of a cohesive modernization program for the PLA.[44] According to this argument, jurisdictional conflict has arisen among several key groups placed in the dual defense industrial structure. Rival armed services perceive different operational requirements. Defense industries aim to upgrade manufacturing facilities to maximize economic gain, while military officers prefer more timely improvements in combat capabilities. Moreover, the lines of authority have been blurred by the impotence of the defense ministry and the dual foci of responsibility. The defense industries, political leaders, and COSTIND all have exhibited a bias toward exports and commercial gain. As the result, no comprehensive force development program for the armed services has been implemented. "Too often, procurement decisions within the PLA itself represent a compromise rather than a clear set of priorities. . . . Economic and commercial issues distort the decisions on upgrading military doctrine, force structure, and equipment." [45]

INTERDEPENDENCE IN THE WORLD ECONOMY

Finally, arms sales present implications for China's efforts at greater integration with the world economy. As seen in the Silkworm sales to Iran, arms sales have conflicted with another modernization goal of acquiring Western technology. Especially in the view of the United States, China's deliveries of arms and missiles, plus repeated denials of such, in regions of instability have harmed its pronounced standing as a responsible actor. The Chinese arms transfer record on missiles raises concern for nuclear proliferation and escalated arms races, particularly in South Asia. Western charges of reckless arms transfers complicate the work of diplomats in the foreign ministry as they lobby for foreign investments, trade, World Bank aid, favorable tariff treatment, or entrance to the GATT. Thus, consideration of trade-offs by China's policymakers will partly affect Chinese arms sales in the next decade.

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[40] *Ming Pao* (Hong Kong), April 24, 1988, p. 9. Interview with PLA General Logistics Department Director, Zhao Nanqi; cited by Latham, p. 87.

[41] U.S.-China Business Council files.

[42] Gillespie, Richard E. "The Military's New Muscle," *The China Business Review*, Sept.-Oct. 1989. p. 27.

[43] Shichor, p. 271.

[44] Richard Gillespie and Richard Latham argue this view.

[45] Gillespie, p. 29-30.

IV. OUTLOOK FOR THE 990S

In the 1990s, China can be expected to continue its aggressive marketing of weapons for both political and commercial reasons. Indeed, U.S. intelligence reported in early 1990 that China appeared to be preparing for a new round of missiles sales to Iran and Syria.[46] However, China's pursuit of sustained or increased arms sales will likely be circumscribed by increased economic interdependence, continuing global decline in demand for arms, greater American efforts to emphasize nuclear non-proliferation in a new era of superpower cooperation, and the resolution of tensions along China's borders with the Soviet Union, Vietnam, and India.

INTERNAL FACTORS

One domestic factor that may encourage arms sales is that political leaders in Beijing realize the imperative of raising morale within the PLA after having assigned to the military lower priority in the modernization efforts of the last decade and after using troops to suppress pro-democracy demonstrations in June 1989. This need to placate the PLA has been reflected in the military's 11.5 percent share in the 1990 budget, the first increase after ten years.[47] With political realities and budgetary constraints, the PLA could argue its case for the continued pursuit of arms sales earnings to meet its needs.

Another positive factor is the improved capacity of the Chinese defense industry that will allow it to take advantage of market opportunities. Chinese military suppliers have proven capable of providing huge quantities of low-technology weapons at competitive prices to the developing world. At the same time, ongoing Chinese efforts to upgrade older Soviet models and develop an "interim generation" of more advanced Chinese weaponry will allow China to remain on the scene as a major arms supplier.[48]

There may be domestic issues that would mitigate the enthusiastic production and marketing of arms for export. First, one scholar points out the increased relevance of the "guns and butter" tradeoff for Chinese policy-makers. The question of resource allocation between military and civilian purposes will be more salient in the

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[46] Gordon, Michael. "Beijing Avoids New Missile Sales Assurances," *New York Times*, March 30, 1990. p. A7.

[47] Cheung, Tai Ming. "Political Payoff," *FEER*, April 5, 1990. p. 28–9.

[48] Miller, p. 21.

1990s because of efforts over the last decade to integrate the military and civilian research and production sectors.[49] For example, 50 percent of production by the giant defense corporation, Norinco, are now civilian goods,[50] reflecting efforts to divert the excess capacity of the military complex for the civilian sector of the Chinese economy. Second, state management of the greatly expanded defense industrial bureaucracy may involve efforts to control redundancy and corruption. Finally, there will continue to be conflict between the business of arms dealers and the tasks of diplomats.

EXTERNAL VARIABLES

It appears that several external circumstances in the 1990s will constrain China's continued marketing of arms for profits and influence. Increased economic interdependence has brought a tradeoff for China between arms sales profits and potential economic and technological gains from cooperating with the West on strategic issues. After Iraq's invasion of Kuwait in early August 1990, China promised to withhold arms sales to Iraq in hopes of increasing Western trade and investments. China's constructive role against Iraq in part led to the easing of sanctions by the European Community [51] and the continuation of most-favored-nation status on tariffs for Chinese goods, despite the passed U.S. House of Representatives resolution to disapprove it.[52] Beijing appears to have calculated that gradual progress towards the resumption of trade, investment, and loans to levels prior to the violent crackdown in June 1989, as well as continued friendship with Saudi Arabia, represent potentially greater gains than any arms sales profits from or leverage over Baghdad.[53]

The ending of the Cold War has given Washington greater maneuverability to stress weapons non-proliferation in the developing world. One consequence was the Bush Administration's October 1990 suspension of $240 million in annual military aid to Pakistan due to suspicions about its nuclear capability.[54] The change in superpower relations may translate into heightened American sensitivity and willingness to use economic and technological leverage to prevent the spread of arms, and missiles in particular, by Beijing.

Chinese arms sales will also be affected by changes in the international arms market. The value of arms sales agreements with Third World buyers has generally declined during 1982–1989.[55] This trend can be mainly attributed to the completion of many force improvement programs in the developing countries.[56] High growth rates and continued arms races, especially in air power, continue to make Asia a favorable market for arms. However, Asian militaries tend to prefer advanced Western equipment over Chinese supplies. This view is held prominently by Thailand's Air Chief Marshal who put a purchase of Chinese F7M fighters on hold after he took office in October 1989.[57] Moreover, the pattern of ASEAN countries matching each other's acquisitions of Western hardware is likely to continue.[58] The late 1980s have seen the scaling back of Third World conflicts, including the end of the Iran-Iraq War, the Soviet pullout from Afghanistan, and Vietnam's withdrawal from Cambodia. In the future, China may no longer be able to count on arms sales opportunities of the same lucrative and urgent nature.

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[49] Latham, p. 80.

[50] U.S.-China Business Council files.

[51] Sun, Lena. "EC to Ease Sanctions on China," *Washington Post*, October 24, 1990. The sanctions were imposed in response to the Tiananmen crackdown in June 1989.

[52] Farnsworth, Clyde. "Assailing Beijing, House Votes a Rise in China's Tariffs," *New York Times*, October 19, 1990. p. 1. House Joint Resolution 647 passed 247–174 on October 18, 1990, and was received in the Senate.

[53] Sun, Lena. "China Hopes Its Cooperation Will Yield Benefits," *Washington Post*, September 15, 1990. p. A13.

[54] The suspension was required by Sec. 620E of the Foreign Assistance Act, which makes U.S. assistance conditional upon presidential certification that Pakistan does not possess a nuclear explosive device. Also see, Coll, Steve "Rifts Appear in U.S.-Pakistani Alliance," *Washington Post*, October 22, 1990. p. A13.

[55] Grimmett, Table 1.

[56] Miller, p. 19.

On the supply side, China's arms sales prospects will be affected by its existing (e.g., Soviet, American, French, British) and potential (e.g., Brazilian) competitors in the arms market. After Iraq's invasion of Kuwait, the Bush Administration's decision to sell multibillion dollar packages of weaponry to Saudi Arabia may have cut China off from that market. The Soviet Union appears to be in possession of a large stock of surplus arms after a number of East European countries terminated contracts.[59] Further, one specialist notes that "Brazil has long been building the kind of industrial infrastructure which can support an arms industry at the upper edge of the middle technological level." [60] Finally, although the effects are not yet fully apparent, changes in former Soviet bloc countries, which have been important arms exporters, will affect the market—either through the countries' dumping of Soviet supplies on the market or creation of a vacuum for further Chinese expansion.

Lastly, China's improved external security situation in the 1990s may also affect its decisions on arms sales. At the time, China appears ready to enjoy the lowest level of tensions along its borders since the 1950s. The recent gradual normalization of relations between China and India was highlighted by then Prime Minister Rajiv Gandhi's end of 1988 visit to Beijing. After Vietnam's military retreat from Cambodia, China has agreed to halt arms shipments to the Khmer Rouge and invited top Vietnamese leaders for a secret summit in the southwestern Chinese city of Chengdu in early September 1990.[61] Beijing's new friendship with Moscow has expanded to military transactions.[62] In sum, reduced fears of Soviet-Vietnamese encirclement will lessen the urgency of Chinese arms sales to neighboring countries for political goals.

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[57] Cheung, Tai Ming. "Air Arms Race Builds Tensions," ***FEER***, Feb. 15, 1990. p. 55; Tasker, Rodney. "Political High-flier," ***FEER***, Dec. 7, 1989. p. 21.

[58] Tasker, Rodney. "Reaching for the Sky," ***FEER***, Feb. 22, 1990. p. 22.

[59] Cheung, Tai Ming. "A Sale is in the Air," ***FEER***, Sept. 6, 1990. p. 20.

[60] Miller, p. 22.

[61] Delfs, Robert, "Carrots and Sticks," ***FEER***, October 4, 1990. p. 11; Also see, Chanda, Nayan. "Vietnam's Vice Premier Sees Progress Toward Normalizing Relations with U.S." *Asian Wall Street Journal*, October 15, 1990. p. 24.

[62] In the first sale of military items since rapprochement, Moscow agreed to sell China two dozen troop-carrier helicopters (***FEER***, October 11, 1990, p. 8). Also, the Chinese have been negotiating the purchase of 12 Soviet Su27 ground attack fighters for the PLA Air Force (Cheung, Tai Ming. "A Sale is in the Air," ***FEER***, September. 6, 1990. p. 20).

V. CONCLUSION

The leaders of China face complex domestic and international dilemmas in making arms sales decisions. Yet, the political and military leaders in Beijing, with general consensus about the objectives of exporting arms, are not likely to relinquish the contributions of arms sales to modernization and foreign policy. Chinese decisionmakers will continue to choose between arms sales and further Western linkages on a case by case basis depending on the perceived net gains for the Chinese national goals of both power and wealth. Thus, the United States will continue to face issues stemming from the effect of Chinese arms sales on American interests globally.

V. INTERDEPENDENCE

OVERVIEW

By Arlene Wilson *

China's economic isolation from the Western world changed dramatically after the Third Plenum of the Eleventh Communist Party Congress in late 1978. Spurred by a desire to modernize, acquire new technology, and stimulate economic growth, the Chinese leadership, headed by Deng Xiaoping, initiated a policy of "reform and opening up." Although the policy included both domestic and international initiatives, the papers in this section focus on the "open door policy" aimed at encouraging foreign trade and investment.

NATURE AND EFFECTIVENESS OF THE OPEN DOOR POLICY

In general, China's integration into the world economy included institutional and legal changes to decentralize the foreign trade bureaucracy, protect the interests of foreign investors, and facilitate borrowing from abroad. More specifically, China enacted joint venture laws, established local foreign trade entities, set up special economic zones (SEZs), joined multilateral institutions, and liberalized import, export and foreign exchange restrictions. But progress in opening up was sporadic. Three times during the 1980s, retrenchment followed a period of rapid economic changes, creating much uncertainty for foreign businesses. Typically the reform periods in 1979-80, 1984 and 1987-88 were characterized by expansionary monetary policy, increased investment spending, liberalizing measures for exports, imports and foreign investment, decentralization of foreign trade decisions, and the establishment of special economic zones and coastal areas. But, sometime after new measures were initiated, imports swelled, creating foreign exchange problems, and inflation, fueled by easy credit and shortages of supplies, became severe. With few economic levers to control the economy and Beijing's fear of social unrest, the leadership retracted some of the reforms in 1980, 1985 and late 1988. For example, investment spending was strictly curtailed, foreign trade decisions were recentralized by abolishing some local trade entities, and the SEZs' autonomy was reduced. During the retrenchment phases, Western exports to China declined, as did foreign investment in China.

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Papers not mentioned in this overview were not available to the reviewer at the time this was drafted.

The basic framework of laws and regulations on foreign investment in China were enacted in the years 1979 through 1982. These legal changes protecting the rights of foreign investors made possible the unprecedented increase in foreign direct investment contracts in China from $1.7 billion in 1980 to $5.6 billion in 1989. In his paper on Chinese law, James Feinerman explains why foreign investors, despite the reforms, continued to express many legal concerns. For example, the many different Chinese tax regimes complicated foreign investment in China. Getting approval to market products in China was difficult, and approval of potential investment projects could be slow. Foreign exchange problems remained, despite Chinese efforts to resolve them. The Chinese sometimes interpreted legal contracts as nonbinding, and did not always permit foreign investors to make personnel decisions. Recent legal reforms in April 1990 attempted to address these issues. The author concludes that China, after making some mistakes, now seems to have a clearer system of law and regulation. The goals of SEZs are to attract foreign investment, facilitate export industries, and serve as a link between the foreign and domestic market. To that end, investors in SEZs receive tax and tariff preferences, flexible labor and wage policies, more modern infrastructure, and more freedom from bureaucratic control. SEZs were successful in stimulating foreign trade and investment, but have been criticized for their high infrastructure cost, their use of domestic funds (diverting funds from domestic projects) and possible corruption. Economic criticism, as well as political discord, led to several periods of retrenchment. But, George Crane, in his paper, notes that periods of retrenchment were usually short because foreign investment, needed for modernization, declined. He concludes that SEZs are inherently unstable because they are subject to ideological and economic criticism, but, at the same time, cannot be ended by opponents who are interested in modernizing because foreign investment would then decline.

As China opened up, those provinces most actively engaged in foreign trade and investment grew more rapidly, had a higher standard of living, and enjoyed more autonomy from Beijing's policies than did other provinces. For example, coastal provinces avoided to some extent Beijing's 1988-89 austerity program by selling in foreign markets and borrowing from foreign investors. Erin Endean, in her paper on China's foreign commercial relations, maintains that the gulf between the coastal provinces and others will widen in the future. But, at the same time, the coastal provinces will be more vulnerable to a downturn in global economic conditions than the other provinces.

According to Martin Weil, foreign businesses did not have an easy time operating in China in the 1980s, despite the increasing openness. In particular, the cycles of reform and retrenchment, as well as interference by the Chinese bureaucracy in business decisions, increased the uncertainty and the cost of doing business in China. He concludes that those foreign companies which had large sales volumes or which produced for export in the coastal provinces, usually profited. But for others, perhaps the majority, optimism for the future was China's main attraction.

Membership in multilateral economic institutions began when China joined the International Monetary Fund and the World Bank (and its affiliated agencies) in 1980. After acquiring observer status in the GATT in 1983, China applied for GATT membership in 1986. China also joined the Asian Development Bank in 1986. According to William F. Feeney, the grants, loans and credits China received from its participation in international economic institutions have been "indispensable in accelerating China's modernization." For example, from 1981–90, China's cumulative borrowings from the World Bank and its affiliate, the International Development Association, were $9.2 billion. Moreover, China also benefitted significantly from the research analysis, advice and consultation provided by the institutions' highly qualified staff. China's external debt from all sources, estimated at $40 billion to $50 billion, is considered well within China's ability to pay.

The acquisition of foreign technology is a major goal of China's opening up. According to Roy Grow, although the national government and local authorities are involved in the decision to acquire new technology, the enterprise is the most crucial. Successful enterprise managers define the need for foreign technology, discuss the options with end users within the enterprise and initiate the process of acquiring new technology. Since the enterprise is so important in the process, national policies affecting enterprise managers will have a large effect on the success or failure of future technology projects.

During the 1980s, China benefitted from the policy of export-led growth, as standardized products (especially textiles and apparel) mass produced by low-wage workers were sold in large developed-country markets. But, as William Fischer discusses, this strategy may be less successful in China in the future. Problems in Chinese infrastructure, recentralization of authority during the retrenchment periods, the possibility that automation will replace workers in some industries, and growing trade barriers in industrial markets may limit future growth of mass-produced items. The author concludes that China needs more intimate relationships with foreign countries to overcome export barriers abroad and infrastructure difficulties in China. In order to attract foreign technology and managerial skills, China must rely on its comparative advantage of a potentially large market, not low-wage labor.

CHINA'S CHANGING TRADE PATTERNS

From 1979 to 1989, China's foreign trade grew from $29 billion to $110 billion. Over the same period, China's exports increased from 5 percent to 22 percent of GNP, an indication of the tremendous importance of international trade to China's modernization program.

More than half of China's trade is with Asia, and such trade is growing at a rapid rate. Not surprisingly, Hong Kong, through which many of China's exports and imports are transshipped, is China's largest Asian trading partner. Other evidence of the close economic linkage with Hong Kong is the large amount (70 percent) of foreign direct investment that comes from Hong Kong, much of it going to Guangdong province in southern China. Japan, China's second most important Asian trading partner, is a source of crucial technology and foreign loans. In recent years, China's trade and investment with Taiwan and South Korea, although still relatively small, have grown rapidly and are particularly important in some areas. For example, the recent growth of the Xiamen SEZ in Fujian province reflects significant investment from Taiwan. John Frankenstein concludes that Asia's importance in China's trade will probably increase in the future, but, at the same time, China's future trade depends crucially on the way in which China deals with the absorption of Hong Kong in 1997.

China's bilateral trade with the United States grew from $2.3 billion in 1979 to $17.8 billion in 1989. Growth of U.S. imports from China was strong and steady, while U.S. exports fluctuated considerably from year to year, partly as a result of periodic retrenchment in the Chinese open-door policy. The steady upward trend in U.S. imports from China resulted in a widening of the U.S. bilateral trade deficit to $6.2 billion in 1989. As Nai-Ruenn Chen notes in his paper, the U.S.-China trade deficit may widen further as other countries, especially Taiwan, shift production of exports to China.

U.S.-China bilateral trade issues reflect divergent philosophies and interests. U.S. export control policy, for example, frustrates the Chinese desire to import high-technology products. U.S. firms invest abroad to make profits or to gain market access for the future, while China views foreign investment as a means of acquiring new technology, management skills and funds to stimulate modernization. Other often contentious bilateral trade issues are the protection of U.S. intellectual property rights in China, textile trade, the application of U.S. import control laws to products from China, and the U.S. granting of most-favored-nation status to China. China's bilateral trade of $3.9 billion with the Soviet Union in 1989, although growing rapidly since trade ties were renewed in 1983, is small compared with its importance to China in the 1950s. The bulk of Sino-Soviet trade, still centrally planned, is low because both countries are focusing on selling to hard-currency countries to acquire technology. Nevertheless, Sino-Soviet border trade, usually outside official trade channels (although permitted by both governments) appears to be growing rapidly. Sharon Ruwart concludes, in her paper, that, although China fears the recent political changes in the Soviet Union, "pragmatism will prevail and trade will be encouraged."

THE TIANANMEN INCIDENT AND THE FUTURE OF THE OPEN DOOR POLICY

Foreigners were already scaling back new investment in response to the austerity program of 1988–89 when the Tiananmen incident occurred in June 1989. After the shock of Tiananmen, however, international institutions, banks and individual countries strongly curtailed lending to China. For example, World Bank lending to China, which had been projected at $1.5 billion–$2 billion before June 1989, fell to $500 million in the 12 months beginning June 1989. Tourism from the United States and Japan declined dramatically, but an increase in tourism from Taiwan mitigated the total decline. The reduction in lending and decline in tourism fueled a foreign exchange crisis in China, and administrative controls were reimposed.

Although the Chinese leadership continues to publicly support the open door policy, the Tiananmen incident dramatically changed the perception of Western business regarding China. Perhaps most important, the close link between politics and economics in China is now very evident. Most authors of papers in this section agreed that the Tiananmen incident seriously reduced confidence in China, at least for the near future. Foreign investors (other than those from Taiwan, who continued to invest in China) will likely wait until the aging Chinese leadership is replaced and the political situation is clarified before committing large amounts of funds in China.

Nevertheless, by 1990, some of the foreign economic links were improving. Western governments lifted some of the economic sanctions they imposed right after the shock of Tiananmen and multilateral institutions resumed some lending. For example, in 1990 the World Bank authorized loans for basic human needs and some Western governments resumed export credits for China.

Many authors suggested that the changing world environment does not bode well for China's economic links to the West in the near future. Recent political and economic changes in the Soviet Union and Eastern Europe may make them more attractive to foreign investment and also weaken China's negotiating position as a strategic buffer between the United States and the Soviet Union. Markets in the West may not be as open to Chinese exports as they were for Japan and the newly industrializing countries in the past. A world recession, if it occurs, would likely inhibit China's exports.

COSTS AND BENEFITS OF INTERDEPENDENCE: A NET ASSESSMENT

By Wendy Frieman * and Thomas W. Robinson **

CONTENTS

Page

Summary 718

I. General Ideas Concerning Interdependence 719

II. Facets of Chinese Interdependence 723

III. Chinese Perceptions of Interdependence 730

IV. Benefits and Costs to China of Interdependence 734

  A. Benefits of a Higher Degree of Economic Interdependence and Costs of a Lower Degree of Economic Interdependence 734

  B. Costs of a Higher Degree of Economic Interdependence and Benefits of a Lower Degree of Economic Interdependence 736

  C. Benefits and Costs to China of Non-Economic Interdependence 736

V. Options for China's Future 739

TABLES

1. China's Relative Foreign Trade Dependence Since 1978 726

2. Commodity Composition of China's Exports/Imports 727

3. Direction of China's Foreign Trade 728

SUMMARY

Interdependence—whether economic, political, scientific, security, or cultural—is a fact of modern life and therefore a normal component of China's development strategy. The questions for Beijing concern the degree and direction of interdependence, connections between economic and other aspects of interdependence, how China evaluates the costs and benefits of interdependence, and what Beijing's actual policy is regarding its several facets. One approximation is to consider which of the several approaches to interdependence China favors—traditional international trade theory, dependencia, developmentalism, export-led growth, the "Who is Us" approach, and the "They Own Us" school. The answer appears to be a mixture of dependencia and developmentalism. In terms of the facts, China's economic interdependence has grown rapidly in the last decade to the extent that its "trade dependence" is more than 25 percent of gross national product, while its interdependence with the advanced industrial nations (but not the Third World) is strong in terms of commodity composition. China has also

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become highly interdependent in scientific, security, political, and cultural spheres, and interdependence in these areas in many instances is mutually transmutable. The Beijing leadership has generally not worried about this, except in the cultural sphere.

Chinese analysts strongly favor interdependence as highly beneficial to the country's developmental strategy and, generally, are willing to accept costs—in terms of limits on China's foreign policy freedom and the domestic influence of foreign ideas—in order to avail themselves of the benefits. A complex analysis of those costs and benefits can be made, from which it can be concluded that China will continue to move further toward interdependence, although probably not as rapidly as in the past. The dilemma for current and future Chinese rulers remains the same as that facing every Chinese leading group for the past 200 years: how to gain the benefits of economic interdependence, and hence of modernization, without suffering the concomitant costs of political and cultural transformation away from nativist exclusivism and toward genuine global partnership. The "bottom line" is that the leadership will continue to try to have things both ways but if the costs of interdependence appear to rise even modestly beyond present levels, the door will once more swing shut—if never again entirely closed—and overall modernization will suffer accordingly.

I. General Ideas Concerning Interdependence

Interdependence has been a fact of human activity since the dawn of civilization. People and social institutions always have had to depend on each other to survive or to achieve their goals; in that sense, interdependence can hardly be controversial. Differences do arise, however. Is interdependence sometimes inequitable, so that the "balance of dependence" tilts too heavily in favor of one partner? Does economic interdependence spill over to other spheres, particularly into politico-military affairs, thus greatly complicating equity balance calculations and postulating the danger of overall dependence for small or developing countries? If interdependence is multifaceted, how can it be calculated, especially if the "units" of calculation differ from field to field and if some fields have no quantitative capability of measurement? How, in the face of such problems, can a nation's leaders make policy decisions on important questions of economic life, trade, and other domestic and foreign matters?

There are at least six types of answers to these questions drawn, respectively, from traditional international trade theory, the dependencia approach, development economics, export-led growth, the "Who is Us" school that interdependence is innately good, and its opposite, that it is by nature bad.

- Traditional international trade theory does not generally use the term "interdependence" but rather looks to the idea of mutual advantage. Nations trade with each other only when each gains in the exchange, and attention is devoted largely to questions of comparative advantage, the advantages derived from mutual specialization of production, the setting of the terms of trade through exchange rates, the consequent linking for mutual betterment of the internal economies of the countries in question, and the distortions from the ideal that government-imposed tariffs, quotas, and other restrictions on trade bring. The assumption is that nations are rational actors and that they therefore engage in trade (and become interdependent) only when it is in their interests to do so and end such a relationship of they find this not to be the case. Moreover, it is believed that governments should refrain from interfering in the trade arena and leave such matters to private entrepreneurs. The terms of trade, set by the marketplace, are by definition mutually advantageous to both parties, even if internal markets are severely affected and even if mutual specialization leads some countries to be permanently consigned to an "underdeveloped" status.

- Dependencia argues that the terms of trade between more and less developed nations is by nature unequal by retarding the growth and industrialization rates of the latter. Nations consigned over the long run to be raw materials suppliers to the industrially more advanced nations and receiving in return the manufactures of the latter are kept in a relatively underdeveloped, and hence dependent, state. The means to this end are unequal terms of trade by the actions of transnational corporations, grossly distorted distribution of wealth between a small group of rich and a very large number of poor nations, perpetuation of authoritarian forms of government, and through superior power and knowledge, undue interference by rich nations in the affairs of poorer nations. Unless severely modified by agreed-on international action, this system is self-perpetuating. The way to meliorate the relationship is for more developed nations to make trade concessions to the lesser developed, thus equalizing the terms of trade, and for less developed nations to take government action to raise the price of raw materials, expand capital transfers, reduce foreign control of capital, and nationalize the assets of transnational corporations. Dependency theory takes equity and development as principal values, to which trade must be subordinated. Essentially it is a political theory of trade which assumes an alliance between imperialist (e.g., strong, developed, Western) nations and local authoritarian governments and bureaucracies for purposes of keeping the vast majority of the people of lesser developed nations in economic and political servitude. This theory also presumes that only in a post-colonial era of anti-foreign nationalist governments will development have a chance, and even then the former imperialists will attempt to extend their hold by dominating international economic institutions and proclaiming the benefits of "interdependence." In the dependency approach, genuine interdependence is impossible.
- Developmentalism begins where dependencia leaves off but takes a more optimistic view. So long as economic and political barriers to growth and industrialization are removed, "natural" (generally market-driven) processes within a lesser developed nation will impel it forward. The critical impediment is not external, as in dependencia, but internal: the drag imposed by traditional socio-cultural attitudes, customs, and institutions. These must be removed for progress, which will then

easily move the economy in the direction already taken by Western countries. Indeed, lesser developed countries should deliberately copy Western practices, especially capitalism. On the other hand, democracy is not a necessary condition for development, at least in the initial stages. Rather, the prerequisite is political and social stability, which can be supplied perhaps better by an authoritarian government. Lesser developed nations should Westernize themselves rapidly, hold themselves open to free trade, and encourage foreign investment, aid, and technology transfers. Therefore, tariff barriers, quotas, and other deliberately-raised obstacles to free trade should be avoided, which means that export-led growth strategies should be eschewed despite their obvious success. Proponents of developmentalism believe that interdependence is a good that is the natural product of a nation's gradual entrance into the "modern" world, which is to say that interdependence and internationalization are nearly synonymous. The best example of this approach is Japan between 1868 and 1931, which deliberately opened itself to Western influence, modernized all of its domestic institutions, joined the developed world on equal terms within a comparatively short time, and still preserved the essential features of its own civilization.

- Export-led growth strategies stand between dependencia and an emphasis on development through Westernization. Former colonies did not wish to exchange their previous political servitude for economic dependence but greatly desired to develop as rapidly as possible. A middle way was, fortuitously, discovered. It combined, in a resource-poor land: state-led capitalism; administratively-imposed very low wages; authoritarian government; high tariff and other barriers against Western manufacturers; high risk-taking in the international market through massive state-led investment in a few modern industries (shipping and steel, for example) not justified on the basis of the internal market; massive acceptance of international loans (but not much foreign investment); artificially low (and highly controlled) exchange rates; and aggressive marketing of products in the wide-open markets of the West, particularly the United States. A high balance of payments deficit is deliberately run for many years (and financed through additional loans and constant downward adjustment of exchange rates) on the assumption that later it will not only be balanced by successful sales in developed countries but that substantial surpluses will be achieved. Only in the long run would barriers be lowered, authoritarian political controls be relaxed, foreign capital allowed relatively free reign within national borders, and mutual interdependence achieved. By then, the nation would be fully industrialized, strong enough to compete internationally on an equal basis, and able to participate in the construction of an interdependent regional and global economy. The "four dragons"—South Korea, Taiwan, Hong Kong, and Singapore—are the obvious examples of this model, which has been tried but with much less success elsewhere.
- Interdependence as an approach is based upon certain shared notions. The degree of interdependence is defined by the per-

> centage of a nation's gross national product taken up by foreign trade, i.e., imports plus exports of goods and services. It is noted that for smaller and lesser developed nations, this percentage is higher than for larger and more industrialized countries, but it is also realized that, in the second half of the twentieth century, this ratio is rising for the developing countries as well. Interdependence is not limited to economic matters and is also present in politics, culture, security, etc. And none of these spheres are autonomous: nations can, and do, (or are constrained to) exchange degrees of interdependence in various arenas. Finally, there is a basic division between an emphasis on interdependence as a set of linkages or connections between societies, with little or no judgment attached, and an emphasis on interdependence as a set of mutual dependencies between two or more nations that may be both differential in their manifestations and corrosive in their effects. All agree, however, that the closely connected nature of the global economy makes it inevitable that economic activity or economic policy within a given country will, often rapidly, necessitate a response and consequent changes in the military, political, cultural and other spheres.

Thus, American monetary or fiscal expansion, undertaken for purely domestic economic purposes, will spill over to the international economic sphere through balance of payments changes, linkages between interest rates in American and other nations, exchange rate adjustments, changes in demand for imports, and inflation. Differences in opinion arise only when judgments are attached as to whether such activity, and the responses that decision-makers in other nations feel necessary to take, are "good" or "bad." Most agree, however, that the policy concerns of interdependence among developed, industrialized nations are different in kind and quantity from problems of interdependence between lesser and more modernized nations. Nonetheless, the issues that have arisen among the more developed interdependent nations are also reflected, although to a lesser degree, between the less and the more developed countries and are likely to gain prominence as the former move up the value-added chain of development. Because a rapidly developing China is already facing many of these policy choices, it is useful to examine the two schools of thought that have developed among analysts in the more advanced industrial countries especially as they relate to the effects of interdependence between the United States and Japan.

Two schools of thought on interdependence dominate the American policy community. Essentially, the "Who is Us" school, so labeled in a title of an article by Robert Reich that appeared recently in the Harvard Business Review, argues that interdependence is by and large a good thing. Foreign companies that open plants in the United States, Reich argues, are not only employing U.S. workers who might not otherwise have jobs, they are also transferring technology to the United States and thereby increasing the value of US exports. The United States maintains a high degree of control over these investments, and the risks of repatriation, minimal at most, are more than offset by their benefits. Ultimately, Reich maintains, American competitiveness should be measured not by the market share or profitability of American corporations, but by the degree to which U.S. workers can add value to the world economy and attain a higher standard of living without going into debt. To the degree that foreign investment helps the United States achieve those objectives, the policy community should look on it not with alarm, but with favor. American economic and investment policies should reward any company, American or foreign, that invests in upgrading the quality of the domestic work force, since manpower skills are critical to long-term competitiveness. Growing levels of international trade and investment result in a larger pie for everyone.

The opposing point of view centers on foreign control of American assets and foreign influence over the US policy process. It argues that, although the pie might be getting larger, the United States is getting a smaller and smaller slice. US companies are increasingly threatened by competition from countries that use government subsidies and incentives to incubate fledgling American corporations. In order to circumvent American charges of unfair trade practices, these countries, notably Japan, have begun buying manufacturing plants in the United States. They have simultaneously begun investing in the treasury bond market (which helps finance the American budget deficit) and in American real estate. These events have contributed to a general sense in the United States that there *is* a "they" and an "us," and that "they own us." The "They Own Us" school contends that foreign investment in real American assets gives foreigners (especially the Japanese) the power to control the future of our domestic economy. The policy prescriptions emanating from this perspective range from protection of domestic industry through tariffs and other entry barriers, to formulation of an industrial policy that "picks winners" and targets key sectors for government subsidies.

II. Facets of Chinese Interdependence

What does interdependence look like in the Chinese case? With what nations is China interdependent and to what degree? Can interdependence be specified within China, that is, are some regions or industries more interdependent than others? Aside from economic interdependence what other types of interdependence exist in China? What measures are available to Beijing to control interdependence? And does, or can, China exchange interdependence in one sphere, say national security, for interdependence in another, say economic?

In the current international environment, all nations are interdependent to some degree. And for China, neither isolation nor complete dependence are workable or desirable policies. What Beijing wishes is to walk a middle ground between these extremes, maximizing the benefits of interdependence while minimizing the risks. Moreover, its entire modernization program rests on its ability to tap the international environment for resources: monetary, technological, and human. Some useful distinctions are nonetheless apparent. First, engagement is not the same as interdependence. China can be part of an international organization, or reach out to the international community in some way, without necessarily becoming inextricably intertwined with it. Second, economic and technological interdependence is not generally symmetrical between the parties involved. Hence, states need not behave in mirror image fashion toward each other, since the calculus of costs and benefits are different for each. Third, the ultimate test of Chinese interdependence with the rest of the world is what happens when China or one of its partners loosens ties. A premise of American policy toward China, for instance, is that if China is enmeshed in a network of international ties, it will fear losing them and will avoid angering major trading partners. It will therefore have a stake in behaving responsibly by international standards. Chinese behavior at Tiananmen in June 1989, when coupled with American policy changes thereafter, demonstrated that whereas the degree of "enmeshment" was less than had been supposed, China was still susceptible to the notion of an international behavior standard and has accordingly modified its foreign economic and diplomatic policies—if not its domestic orientation—accordingly.

There are a number of measures of Chinese economic interdependence. One is the very large growth, in percentage and absolute terms, of Chinese foreign trade since the early 1980s. From 1980 to 1989, exports grew from less than 27 to 195 billion yuan, while exports grew from 30 to 220 billion yuan. Another is the degree to which China permits foreign investment, including foreign equity participation and foreign management of Chinese plants. China has encouraged the establishment of joint ventures in virtually every industry, some quite large and many foreign managed. By late 1989, direct foreign investment in China totaled $32.1 billion over 20,000 projects. A third is China's willingness to borrow from foreign commercial and multilateral institutions. Loans give foreigners a say in how the economy is managed and exposes China to the vagaries of international financial markets. China has minimized the risk by borrowing less than "safe" limits for developing countries and has adeptly managed its external debt. The Chinese debt-to-gross national product ration (a high of 11.9% in 1987) and debt service as a percentage of exports (which reached a high of 10.7% in 1986) are well below the norm for developing countries.

But China is not highly interdependent economically if by that term one means exports or imports as a percentage of gross national product. Generally speaking, neither figure in recent years has been much above one-eighth of the total. On the other hand, if the degree of economic interdependence is defined as the sum of imports and exports as a percentage of gross national product, China's degree of "trade dependence" has risen greatly in the last decade, from less than 10 to more than 25 percent. This is illustrated in Table 1. These figures can be compared with similar numbers for other relevant economies. Thus, the United States in 1989 was about 20 percent trade dependent (i.e., imports plus exports as a percentage of gross national produce), Japan 27 percent, Hong Kong near 100 percent, Taiwan 78 percent, West Germany 63 percent, and South Korea 66 percent. So by this definition of the term "trade dependence," China was near the low end of the spectrum.

Nonetheless, China's imports supplied a critical portion of the wherewithal for its industrialization and overall modernization, while that is not always the case for these other countries. Those at a high level of industrialization produce a larger portion of their modern equipment at home. Those that are hard currency economies have less difficulty purchasing needed goods abroad. Therefore, "trade dependence" figures must be modified according to the level of industrial development of the country in question. While there are many measures of economic modernization, for trade dependence comparison purposes perhaps the percent of the population engaged in non-agricultural pursuits is an acceptable measure. In the case of the United States, about 98 percent of the population is engaged in non-agricultural pursuits, while in China the figure is 29 percent, or nearly a 3:1 ratio. If such reasoning be accepted, China is much more trade dependent than the United States, even though both nations are relatively low in terms of the percentage of gross national product devoted to trade. Probably China's trade dependence, if that term now be refined to mean the degree to which the country depends on trade for powering economic modernization, is much higher than that of the United States and probably is closer to that of South Korea. In other words, some multiplier needs to be attached to the trade dependence figure to take into account the difference in modernization between and the advanced economies. But such a multiplier is undoubtedly not as high as 3:1 (which would place China's trade dependence as high as 80 percent).

If one looks at the composition of imports and compares it with the kinds of commodities—mostly industrial equipment and high technology items—necessary for successful economic modernization, it becomes clear that China has a much higher degree of interdependence with the more developed industrial nations than with the Third World. This is illustrated in Table 2.

Further, if one considers the regions of the world with which China trades, it is again clear that China is economically linked with the developed countries of Asia, Europe, and North American so far as imports and exports are concerned, as shown in Table 3, but not the Third World nations of Asia, Africa, and Latin America.

Finally, the different regions of China are differentially interdependent with other nations. The coastal provinces, especially Guangdong, Zhejiang, Jiangsu, and Shangtong, and some of the coastal or Yangtze Valley cities, such as Shanghai, Guangdong, Anhui, Beijing, and Tianjin, have since 1978 been oriented increasingly toward the international market, while the inland provinces have concentrated on the internal Chinese market. Figures indicating the degree of such interdependence for the coastal provinces are not available. However, the Chinese press is filled with stories and debates as to the efficacy and consequences for China's modernization of the increasing bifurcation of the economy into a modern, foreign trade-oriented, and interdependent coastal sector and a traditional, internally-oriented, and independent inland sector.

China's interdependence is to be found not only in the economic realm. There is also interdependence in the spheres of science, security, politics, and culture. In science, China has clearly become an active participant in the international research community, tap-

TABLE 1

China's Relative Foreign Trade Dependence since 1978
(in Billions Yuan)

Year	GNP	Exports	Imports	Exports & Imports	Exports and Imports as % of GNP
1978	358.8	16.76	18.74	35.50	9.89
1979	399.8	21.17	24.29	45.46	11.37
1980	447.0	27.12	29.88	57.00	12.75
1981	477.3	36.76	36.77	73.53	15.41
1982	519.3	41.38	35.75	77.13	14.85
1983	580.9	43.83	42.18	86.01	14.81
1984	696.2	58.05	62.05	120.10	17.25
1985	856.8	80.89	125.78	206.67	24.12
1986	972.6	108.21	149.83	258.04	26.53
1987	1,135.1	147.00	161.42	308.42	27.17
1988	1,401.5	176.76	205.44	382.20	27.27
1989	1,578.9	195.60	219.99	415.59	26.32

Source: China Statistical Yearbook 1989

ping into the wealth of international scientific literature, attending and participating at international conferences, participating in scholarly communications, establishing personal relations with non-Chinese colleagues, and setting up exchange programs in many fields. Both government-to-government and privately funded projects have proliferated to the point where no once can keep track of all that is taking place. During the 1980s, more than 70,000 Chinese students enrolled in American colleges and universities. Much of China's scientific progress since 1978 has been the product of international scientific cooperation.

In the national security realm, China has also become highly interdependent with the Asian and global security systems. Its own security depends not only on its own efforts but on the structure of Asian and global security and on the foreign and national security policies of other nations, especially the United States and the Soviet Union. During the Cold War, centered around the competi-

TABLE 2

Commodity Composition of China's Exports/Imports

In Percentages

Year	Agriculture	Minerals	Chemicals	Light Industry/ Textiles	Heavy Industry	Misc.
1982	21.19/ 38.61	23.78/ .95	5.35/ 15.22	19.25/ 20.25	5.65/ 16.61	24.78/ 8.36
1983	22.29/ 26.63	20.99/ .52	5.63/ 14.88	19.64/ 29.41	5.49/ 18.64	25.96/ 9.92
1984	22.60/ 18.49	23.06/ .51	5.22/ 15.46	19.33/ 26.70	5.71/ 26.43	24.08/ 12.41
1985	24.48/ 12.11	26.08/ .41	4.96/ 10.58	16.43/ 28.16	2.82/ 34.83	25.23/ 10.31
1986	24.53/ 12.00	11.90/ 1.17	5.60/ 8.79	19.02/ 26.09	3.54/ 39.11	35.41/ 12.84
1987	22.03/ 14.75	11.52/ 1.25	5.67/ 11.59	21.73/ 22.51	4.41/ 33.08	34.63/ 16.10
1988	22.00/ 16.80	8.36/ 1.42	6.09/ 16.54	22.07/ 18.84	5.82/ 30.18	35.66/ 16.22

Source: China Statistical Yearbook 1989

tive alliance-alignment systems of the two superpowers, China's security depended on its agility within the American-Chinese-Soviet strategic triangle. Sometimes China played that game well, sometimes not; but its security was not determined by its own efforts. With the end of the Cold War in 1989-1990, the Soviet threat declined greatly, as did China's need to depend for security on the United States. But China remained security interdependent, not only on the policies of the remaining superpower, the United States, but also on the rapidly changing structure of power and organization in Asia and elsewhere. Thus, when the Gulf crisis emerged in the late summer of 1990 and China found its national security even mildly subverted by a distant Middle East strongman, it looked to interdependence and the principles of the United Nations and the procedural rules of the Security Council.

TABLE 3

Direction of China's Foreign Trade
Value of Exports/ Imports in Millions of U.S. Dollars

Year	Industrial Countries	Africa	Asia*	Europe	Middle East	Western Hemisphere	U.S.S.R. and Other Countries
1978	6,094/ 8,056	533/ 192	727/ 450	564/ 544	661/ 183	108/ 458	1,185/ 1,060
1979	8,708/ 11,788	603/ 261	1,044/ 508	625/ 747	808/ 165	229/ 782	1,353/ 1,576
1980	12,719/ 16,561	685/ 360	1,514/ 855	773/ 825	985/ 357	410/ 719	1,283/ 1,484
1981	15,378/ 16,473	676/ 375	1,528/ 796	743/ 739	1,059/ 346	506/ 639	820/ 923
1982	15,200/ 14,446	760/ 261	1,393/ 1,123	548/ 661	2,725/ 272	528/ 597	707/ 1,186
1983	15,686/ 16,330	525/ 311	1,291/ 886	539/ 646	2,742/ 294	432/ 1,290	869/ 1,261
1984	18,202/ 20,883	543/ 310	1,552/ 1,169	507/ 799	2,435/ 280	449/ 888	1,129/ 1,393
1985	20,617/ 34,823	421/ 285	1,493/ 2,093	754/ 1,290	1,764/ 194	501/ 1,825	1,764/ 1,901
1986	23,567/ 35,004	574/ 254	1,605/ 2,071	1,034/ 1,624	2,109/ 150	363/ 1,550	2,101/ 2,530
1987	29,623/ 35,507	1,230/ 154	2,121/ 1,860	1,190/ 1,393	2,642/ 279	410/ 1,161	2,223/ 2,319
1988	37,127/ 43,528	1,642/ 245	2,626/ 2,677	1,090/ 1,546	2,089/ 577	231/ 1,925	2,748/ 3,302

SOURCE: U.N. Trade Statistics

China is also politically interdependent with foreign nations. Whether Beijing is able to obtain developmental loans from Europe, Japan, and the United States, or from the World Bank, depends on the political attitudes toward China of those nations and of the multilateral economic institutions. After Tiananmen, those attitudes soured, resulting in a cutoff or a major slowdown of loans, as well as a severe dropoff of investment, trade, technology transfers, and tourism. It was in the hope of re-establishing the flow of such external economic assistance that China in mid-1990 changed its foreign policy orientation to one of cooperation with other countries on such important international political issues as Cambodia, Korea, Kashmir, and Iraq. China's economic development is thus strongly linked with the political relations Beijing maintains with relevant foreign countries and with the foreign policies of the latter.

China is, finally, culturally interdependent with other countries and this too affects Beijing's success in economic development.

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* Hong Kong and Singapore are grouped with the Industrial Countries.

With an attractive traditional culture, China continues to appeal to many peoples, in Asia and beyond, and there is, in effect, an "outflow" of Chinese cultural influence to the rest of the world. That is why, in normal times, large number of tourists come to the country and why certain nations, such as the United States, take a special interest in the lives of the Chinese people and adopt generally favorable policies toward China. But China also receives a great deal of cultural influence from abroad, particularly in the post–1978 reformist, open door period. Returned students, the international media, exchange scholars, tourists, foreign businesspeople, entertainment personalities, translators of books, are all conveyors of foreign cultural influence to China. And it has long been established that it is impossible to "cleanse" foreign technology, capital, and trade from their cultural content. Thus, China's cultural interdependence is an important factor in its economic development and, in particular, in its foreign trade.

Once the notion of different arenas of interdependence is introduced, the question arises as to how they interrelate among themselves and how each affects China's economic interdependence. The problem is complicated, and perhaps insoluble, for two reasons. First, there is no clear way to measure the interdependence created by these influences. No quantitative measure exists in most of the four spheres just described. Even if a measure existed, there would still be the problem of how to relate one quantitative measure to another. Currency equivalents are a rough measure in the trade arena, and perhaps destructive power in the national security realm could also be measured, if very roughly, by military budgets established in national currencies. But political and cultural influences are, by their nature, not measurable although their influence is real and often pervasive. Second, the above illustrations demonstrate that the various sectors of China's interdependence are themselves interdependent. Economic and security interdependence, for instance, clearly and directly influence each other and each, in turn, depend on China's political interdependence. And the nature and degree of these mutual interdependences vary from period to period.

Nonetheless, some preliminary conclusions may be in order. First, Chinese interdependence in one sphere, say science, encourages and supports interdependence in other spheres, say the economy. Once the "door" of interdependence is open in one arena, therefore, it is easier to open the door in other arenas and to keep them open. Second, interdependence in one arena can be converted into or substituted for interdependence in other arenas. It has long been established, for instance, that security and economic interdependence can substitute for each other over a broad spectrum of variables; and this has been so in China's case since the 1950s. In particular, much of China's foreign trade between 1978 and 1989 has been with the United States and its allies rather than with the Soviet Union. This is true not only for reason of economic development but also because of Beijing's need to assure its security, through American ties, against the Soviet military threat. Third, given this, the way is open for China to stress interdependence in areas that seem least harmful to state or party interests. Interestingly, and contrary to what might be supposed by outsiders, the

Beijing leadership has usually taken cultural interdependence (i.e., in their eyes to allow foreign cultural influence to penetrate Chinese society) to be much more threatening than security or economic interdependence, which by comparison is generally viewed as less harmful and more tolerable—and probably more necessary. In recent years, there have been several campaigns against Western "spiritual pollution" but not against the dangers of the "parallel tracks" Chinese-American anti-Soviet national security policy nor, needless to say, against conducting an increasing volume of foreign trade with China's Western security partners.

III. CHINESE PERCEPTIONS OF INTERDEPENDENCE

China's attitude toward interdependence has evolved over the post-1978 period to such a degree of prominence that by the end of the 1980s it had become the subject for careful study and, not infrequently, debate by the leadership. Before 1978, Beijing did not, generally speaking, have a separate policy toward the issue or, if it did mention the subject, placed it in the context of more general foreign policy orientations.

Contemporary Chinese policy toward interdependence must first and foremost be related to the historic attitude toward the outside world. During the many centuries of dynastic rule, Chinese emperors and their courts looked upon foreigners, their countries, and their products as perhaps interesting but always inferior in culture and material attainment to that of Chinese civilization. The well-known tributary relationship was the product of this attitude, which by its very nature prohibited even the thought of interdependence. With the coming of the West to China's doorsteps during the 18th and 19th centuries and its use of pressure and force, this attitude gradually began to change to one which begrudgingly accepted equality in international relations.

By contrast, during the late Ching, the warlord period, and the Republic, from 1842 to 1949, China found itself in a position of inferiority abroad: the country fell far behind the West in terms of power and development as dynastic decline, imperialist attempts at colonization, civil war, and foreign invasion all ate into the fabric of Chinese society and its sense of self-respect and well-being. A positive orientation toward the mutual benefits of trade, the presence of large numbers of foreigners in the country, cooperative scientific and technical exchanges, and other nations' investment in and technology transfer to China could hardly be expected under such circumstances. Chinese rulers and many of the intelligentsia saw these as the baleful and inevitable by-product of China's weakness and disunity. They concluded that the way to overcome the country's relative backwardness, while concomitantly preserving the greatness of the culture, was to take only what was necessary from the West, strip it of its cultural connections, and build a new China of restored power and pre-eminence largely through internal efforts.

The post-1949 communist regime also adopted this stance, while stressing the dangers of "neo-colonialism" and Western cultural dominance. Self-reliance and Third World unity against the developed nations (even including developed socialist nations) was therefore the leitmotif of Chinese foreign and trade policies during the Maoist period ending in 1976. With such an attitude, interdependence could have no basis of support in most Chinese eyes, even though in the 1970s and 1980s the immense benefits to be obtained from it in many spheres were becoming increasingly obvious to any Chinese decision-maker who glanced abroad.

With the Deng Xiaoping-led reform era beginning in late 1978, however, interdependence took on a different connotation in line with the new emphasis on the positive aspects of investment, trade, technology transfer, and scientific exchange. That is not to say that the term always received a favorable press, or that the Party was in fact willing to drop its more basic policy of wariness toward foreign cultural influence. Indeed, during several campaigns in the 1980s against "spiritual pollution" and "bourgeois influence," and in favor of self-reliance, interdependence was highly criticized. Moreover, a strain of opposition to the benefits of interdependence continued to be included in generally favorable articles and pronouncements. If there is a consensus among Chinese writers and political leaders on the topic, perhaps it is that interdependence is seen more as a one-way street, with the onus primarily on the Western nations to provide benefits to China. Consequently, to many Chinese interdependence is not the inevitable political, social, and cultural result of economic development and the complex international economic relations that accompany it. If anything, there is a tendency to stick to the neo-colonialist/dependencia approach outlined in Part I.

As the reform impetus peaked in the middle to late 1980s, however, there was a pronounced tilt in favor of interdependence and its benefits to China. China recognized the absolute necessity of opening the door wide and keeping it that way. The close connection between internal economic reform and interdependence, the necessity for China to join all the major global and regional economic organizations (and thus submit itself to their rules), and the realization that the collectivist economic model of autarky and excessive self-reliance all were spelled out in policy pronouncements and scholarly analyses. This was particularly true during the late 1988–early 1989 peak reform period, when it was stated that other nations' "development and well-being are an indispensable condition for one's own progress" and that trans-Pacific economic competition is desirable so long as all remained within the framework of higher common interests and interdependence.

Shortly after the 1989 Tiananmen incident, and as a cover for Western "pressure" on Chinese Party culture, the regime reverted for a time to extreme emphasis on self-reliance and was highly critical of interdependence. Such pressure would merely cause China to struggle more arduously in the spirit of self-reliance to develop the economy. Even then, however, there was a back-handed recognition that China could no longer isolate itself from the international community. The opinion was set forth that Western-led (i.e., American) attempts to punish and isolate China for Tiananmen through imposing sanctions or denying most favored nation treatment could only fail. China had become too important for the world economy for that, both as a supplier of raw materials, a locus for Western investment, and as a major trading nation in its own right. Much of the post-Tiananmen literature and policy statements was set forth in terms of the responsibility of developed nations to recognize the special needs of developing countries, including China. That placed the Chinese approach within the context of so-called North-South relations: the Third World debt crisis, the question of special treatment for developing countries, reversing the flow of financial resources out of developing nations, stabilizing global commodity prices, lowering global interest rates, eliminating developed countries' trade barriers, and generally raising economic growth rates. In early 1990 much of the Chinese literature on interdependence has therefore been couched in these terms.

A year after Tiananmen, however, the analytic Chinese approach had evolved to a further stage, becoming both variegated and sophisticated in outlook. A review of the Chinese language press during the latter portions of 1990, as well as interviews in China by the authors during the period, support this conclusion. Several themes emerge.

- Interdependence is not only a fact of contemporary international life, but both a favorable condition and an indispensable factor in China's own economic development. Interdependence was sometimes defined as including international economic cooperation, including capitalist investment in factories and other facilities in China, increasing scientific and technical interchange, complementarity of natural resources, cooperation in production of material goods and services, and the establishment by Chinese cities and provinces of ties with like foreign entities.
- Chinese writers recognized that interdependence involves international division of labor, i.e., the internationalization of production, economic regionalism, linked growth rates, and international interest rates set by the advanced capitalist countries.
- It was clearly recognized that economic interdependence promoted international peace and security, that there was interpenetration between the two spheres, and the substitutability of economic and security factors for each other, was great; and that economic interdependence tended to promote diplomatic cooperation and recognition.
- China recognized a need to promote a new international economic order stressing equality, mutual benefit, and cooperative prosperity alongside the desired international political order consisting of Chinese-led anti-hegomonism and the five principles of peaceful co-existence.
- China saw its trade with Hong Kong and Taiwan as a particularly instructive example of the benefits of interdependence: China needs the capital, technology, and expertise the others can provide, while they in turn need China's resources and markets.
- North-South (developed-developing countries) relations should be viewed within the context of interdependence. The mutual benefits are obvious: the South (i.e., China) needs the capital and expertise of the North, while the North needs the markets, investment sites, raw materials, and the inexpensive labor of

the South. On the other hand, there is an obvious need to narrow the North-South gap by solving the debtor crisis, stopping the outflow of funds from the South, by stabilizing commodity prices, by combating protectionism, by raising up grow rates in the North as a means of also raising them in the South, by opening markets in Northern countries and also lowering interest rates, and increasing Northern foreign aid to the South.

- Finally, Chinese writers and editorialists inveigh against post-Tiananmen sanctions as being against interdependence. If most-favored-nation treatment promotes mutual benefits (one of the components of interdependence), then taking it away leads to one-sided benefits and exploitation.

Comparing these notion with the six general approaches to interdependence set forth above, it appears that Chinese writers—and therefore the Chinese Communist Party and its government—understand but do not support traditional international theory. They are still taken by the dependencia argument (that is the basis of the North-South emphasis) and either ignore or oppose developmentalism as too capitalist-oriented and too dependent on external political and social influences. They also apparently reject export-led growth strategies although the latter-day coastal-inland division of China into export-dependent and domestically self-sufficient parts would seem to support such an orientation, and come down strongly in support of interdependence as innately "good." One thing is clear: if one were to judge China's approach to economic interdependence, the weighted average of the notions conveyed in the written literature seems amazingly liberal. There is little that most analysts of the costs and benefits of interdependence could criticize. The important question, however, is how much these opinions are reflected in China's trade practices.

And here a problem arises. Even before Tiananmen charges have been made that China is engaging in a mercantilist, one-sided emphasis on exports, and on the amassing of a large hard foreign currency surplus (in 1990 about $26 billion). What is worse, it is accused of dumping, circumventing American trade quotas, and engaging in other unfair trade practices to build up export earnings. The problem is particularly prominent in textiles and toys. At the same time, the centrally-directed Beijing economy restricts American imports, through trade quotas, targeted production, and central directives to enterprises to restrict imports. This issue could become of central concern to overall American-Chinese relations, since the linkage with the most favored nation issue—and hence the human rights question—is direct. Before drawing hasty conclusions as to Beijing's "real" intentions toward the interdependence issue, however, it is possible to supply some reasonable economic explanations for such a policy. First, the major decrease in the rate of gross national product growth after Tiananmen affected the country's ability to purchase foreign goods as well. Imports therefore declined swiftly—but probably temporarily—while exports remained at higher levels as foreign demand did not decline. Second, Beijing changed its exchange after Tiananmen to reflect the lowered global value for the *renminbi*. This also had the effect of promoting exports and retarding imports. Third, China found it necessary to begin massive repayment of loans made in the late 1970s and early 1980s, and was constrained to save up foreign currency to cover these costs. Merchantilism fails as an explanation for this policy. As in the case of previous surpluses, the $26 billion can, and probably will, be spent rapidly, since the purpose of storing up foreign currency is precisely to purchase foreign technology and capital imports necessary to further industrialization. A major buying spree was in fact begun in the fall of 1990, thus attesting to the validity of this proposition.

IV. Benefits and Costs to China of Interdependence

This section analyses the gains China anticipates and the risks it faces by pursuing policies that increase its interdependence. As argued earlier, autarky is not a real option for China, so the relevant debate is not over interdependence versus autarky but over what degree of interdependence is suitable for and acceptable to Chinese leaders. As noted previously, no easy terms are available to characterize degrees of interdependence, nor do numerical scales exist for measuring how intertwined China is with the rest of the world. Indirect indicators—such as international debt and import and export activity—measure particular activities and not China's total economic or other behavior. So what follows will simply use the terms "more interdependence" and "less interdependence" to describe arbitrary points on the continuum.

A. BENEFITS OF A HIGHER DEGREE OF ECONOMIC INTERDEPENDENCE AND COSTS OF A LOWER DEGREE OF ECONOMIC INTERDEPENDENCE

Benefits are obvious. The spectacular growth in the Chinese economy between 1980 and 1990 was possible largely because of the opening to the West and the ability of foreigners to gain access to the Chinese market—albeit not the supposedly lucrative consumer market. Interdependence makes it possible for China to import the equipment and human resources desperately needed for modernization. So the more open China became, the greater the benefits. In examining the costs of less interdependence, the time-frame distinction is critical. The costs to China of pursuing a less interdependent policy in 1979 or even 1982 would have been the risk that the economic gains would be relatively insignificant. Only in hindsight can anyone see exactly what would have been sacrificed. But that cost is very different from the economic cost associated with China's decision to pursue a less interdependent path in 1990. The spectacular growth of the early 1980s was from a comparatively low base, and probably would have leveled off in time. If in the 1990s China chooses to be less interdependent, the rate of economic growth (likely to be much smaller than in the 1980s) might not suffer unduly as a result. In fact, the economy prior to June 1989 was overheated to the point where a severe retrenchment and reassertion of central control were the only possible remedies within the confines of a socialist system. Thus, simply because during one ten-year period more interdependence meant more growth does not mean that the same will apply in the next ten-year period.

The central question in assessing costs of a less interdependent policy is the reaction of the outside world. Chinese policies during the Deng decade of reform inspired confidence in industrialized countries about China's economic future. This led to the participation of foreign firms in developing Chinese industry and to a lesser extent agriculture. Would a less interdependent, less forthcoming, less involved China discourage foreigners who have the capital and the skills China needs? Has China become involved enough in the world economy to avoid the consequences of a lower degree of involvement?

The answers to these questions will be debated for many years. By 1990, China had not yet moved very far away from a higher degree of interdependence compared to where it was in 1980. But the events of June 1989 did test the interdependence proposition and it is possible to draw some tentative conclusions. Despite the outrage over the Chinese government's military response to the student demonstrations, the worst-case economic consequences never materialized. First, foreign investors did not pull out across the board and no existing joint ventures closed or even ceased to operate for more than a few days. On the contrary, foreign firms involved in joint ventures seem determined to persevere. Second, China was adroit at managing its external debt. There was no widespread panic. And whereas China's credit rating fell and many loans were temporarily suspended, the country's balance sheet remained in surprisingly good condition—$11 billion in 1990 and perhaps $15 billion in surplus in 1991. There were no immediate financial problems related to international debt. Third, import and export figures are not dramatically lower than they might have been without sanctions and reprisals from trading partners. The events of June 1989 certainly shook the confidence of foreign buyers in China's reliability as a vendor, as well as the confidence of Hong Kong and Southeast Asian entrepreneurs whose investments have been critical to the growth of China's export industries. Also contributing to a drop in both imports and exports were tight credit policies. However, the reassertion of central control over the economy and the careful scrutiny over import decisions would have probably been imposed independently of sanctions by trading partners.

The more important costs of the Tiananmen incident are probably in the scientific and technical areas. Many in the West were anxious to have contact with a more open, outward looking China, to which Chinese students enrolled in overseas universities would have some incentive to return. Many Western scientists, whose contacts with their Chinese counterparts have done much to advance the state of science in China, are now cynical and disillusioned, and therefore much less interested in bilateral exchanges. And many Chinese students in the United States are either uninterested in or afraid of returning to China. While China is enduring these effects with what appears to be a minimal degree of pain, the costs are nonetheless high.

B. COSTS OF A HIGHER DEGREE OF ECONOMIC INTERDEPENDENCE AND BENEFITS OF A LOWER DEGREE OF ECONOMIC INTERDEPENDENCE

A higher degree of economic interdependence has entailed substantial costs. Costs can be grouped into two general categories: effects on the domestic economy and less tangible political and social effects. For China to be an effective player in the international economic arena and to reap the benefits of interdependence, the Beijing leadership had to undertake far-reaching reforms of the domestic economic and financial systems. Reforms in turn resulted in a tremendous loss of central control over provincial activities, a buying spree that wasted millions (if not billions) of hard-currency dollars badly needed for critical projects, and inflation that by early 1989 was close to thirty percent. China also ran the risk that foreign partners, for political or fiscal reasons, might withdraw and force autarky on the country.

Political and social costs have been equally troublesome to the Chinese leadership and at the same time are much more difficult to quantify. Mainly, they involve Chinese exposure to Western political and intellectual values. These have already had a profound influence on a critical, if small, segment of Chinese society: urban, educated professionals and students on whom the modernization program is vitally dependent. The ultimate nightmare for the current leadership is that foreign values will begin to take hold of the population, as was evident by the Tiananmen Incident in Beijing, and similar demonstrations in many other Chinese cities.

Some potential benefits accrue for China from policies that entail less economic interdependence. Critical is the opportunity to regain control over the economy. It is again important to distinguish, however, between choosing less economic interdependence in 1980 and less interdependence in 1990. If China had chosen a less interdependent path in 1980, it is possible that the population could have remained relatively isolated from foreign values. However, because of the genie-in-the-bottle phenomenon, choosing a less interdependent path in the 1990s does not mean that foreign influence can be held to a minimum.

This discussion can be summarized in four propositions. First, benefits of a high degree of economic interdependence are real, but will probably not be as dramatic as in the past. Second, costs of pursuing a less interdependent path exist but are less significant than they would have been in the early 1980s. Both of these judgments argue for more autarky and less interdependence. Third, costs of a high degree of economic interdependence are high and will probably remain so even if the potential benefits are not likely to be as great in the immediate future as they have been in the immediate past. But fourth, moving to a less interdependent strategy would not necessarily eliminate or reduce the most significant of those costs, due to the genie-in-bottle phenomenon.

C. BENEFITS AND COSTS TO CHINA OF NON-ECONOMIC INTERDEPENDENCE

In Section II, we discussed some types of non-economic interdependence and their relationship to China's economic interdependence. Here we consider three particular benefits and two costs. The first benefit is enhanced military security. Between 1972 and 1989, China was militarily interdependent with the United States, as both took the Soviet Union as their common designated foe, partially integrated their respective security strategies, and integrated this aspect of their foreign policies toward each other with other components, including transfer of some American and other nations' military technology to China. Indeed, the opening of most of the COCOM list of proscribed items was crucial to the very great rise in China's foreign trade and to the entire post-1978 modernization effort. The point of security interdependence, however, is that by placing its security partially in the hands of the Americans, a much greater "amount" of security was made available to China. It was a highly cost-effective operation for Beijing, especially during the critical years 1972–1984 when perception of the Soviet invasion threat was at its peak. And by lessening the need to devote such high percentages of gross national product to arms production and to maintain a very large military force, huge resources were freed to devote to rapid economic development. Such security interdependence was, of course, vital to the United States and its allies in Asia and elsewhere. Thereby Washington, Tokyo, Seoul, Bangkok, and the NATO countries benefitted immeasurably by the effective addition of at least a portion of the Chinese military to the general program of deterring Soviet aggression. There is no way to measure the gains derived from such mutual security interdependence, since war did not occur. But if such gains were somehow monetized, they would have to be somewhere near the level of a large percent of the total assets of the Chinese economy, since China would have inevitably lost a nuclear war with the Soviet Union and found itself dismembered and surely in a chaotic state after such a war.

The second specific benefit to China of non-economic interdependence is that it has helped enable China to become an important player in the "big league" of international relations. For many years, even at the beginning of the Deng-led reforms, China was not taken seriously in international relations. For all its geographic size, large population, and economic and military potential, it was largely discounted in the cabinets of the major post-World War II powers. China in fact was more a international relations dependency, in the sense that its security and development stemmed from its protection or assistance by the Soviet Union or the United States, than it was an independent or at least an important interdependent player. It was also an international outsider by choice, after 1960 belonging neither to the Soviet-led nor the American-led alliance systems nor to the Third World Group of 77.

With Deng's policy of relative openness, however, China began to count in international relations and the various elements comprising its national power began gradually to add together. Trade, security, cultural, and diplomatic components of Chinese foreign policy more and more integrated with, and became in turn penetrated by (i.e., became interdependent with) these same components of the foreign policies of the other major powers. For instance, China became a security protector of South Korea against North Korea, along with the United States, from which followed the development of South Korean-Chinese trade, technology transfer, and the establishment of quasi-diplomatic trade offices in the two capitals. China strongly aligned itself with the United States against the Soviet Union during the latter's occupation of Afghanistan, and this orientation was of considerable assistance in convincing the American government to relax export restrictions and to encourage transfer of much high technology to Beijing. And during the 1990 Gulf Crisis, China's support of American-Russian initiatives helped bring Beijing out of the semi-isolated diplomatic state in which it was placed following the Tiananmen Incident. It also assisted in constructing a somewhat less negative image of the country as a whole (the reality was different, of course—suppression of human rights in the country continued unabated), which in turn was one factor in the American Administration's decision to relax some economic sanctions and the Congress' inability to force reversion of China's most favored nation status.

This last example points up a third benefit of interdependence to China. It is a means to help avoid international isolation in various fields, as well as a safeguard—to the extent the Beijing leadership so desires—against over-emphasis on China-centeredness. By deliberately making itself interdependent in security, diplomatic, and cultural terms as well as through economic interchange, China changes the very term of its international intercourse. And since the country has already proceeded reasonably far down the path of interdependence in these various spheres, it is becoming increasingly difficult, if not impossible, to revert to a policy of self-imposed isolation. Thus, so long as the Beijing leadership desires to be integrated with the international community, interdependence assists China in achieving that end. Avoiding isolation and avoiding China-centeredness are therefore different expressions of the idea of a more positive emphasis on participation in regional and global developments. It also assures that China is accepted not merely as a relatively equal partner in various arenas but, perhaps more importantly, that by being so heavily involved in international affairs it will become a leader that other nations will look to. Interdependence, then, becomes a means for restoring China's centrality that it lost in the early 18th century.

These benefits to China come with at least two concomitant costs. The first is partial control by foreigners of China's foreign relations, especially its military security. Decisions vitally affecting the defense capabilities of the country, its diplomatic position, and its cultural and ideational reputation are now made in foreign capitals as well as in Beijing. Washington and Moscow heavily influence Beijing's military defense posture, its defense budget, and its capability to project military power abroad. The United States and its allies and associates in Asia, Europe, and elsewhere at least partially determine China's diplomatic alignment, regionally, globally, and in international institutions. And China's general reputation is not only a function of what the rulers inside the Chung Nan Hai decide is best for the country—as in the Tiananmen Incident and its long aftermath—but of how other peoples perceive China and its cultural-intellectual acceptance abroad. For a country that, perhaps above all others, has prided itself on its ability to determine its own fate on the basis of its own values and actions, that cost is high, and is perceived so by the leadership. In fact, the line between benefit and cost derived from the various types of interdependence is often judged to be very fine. That helps explain why China switches so frequently between favoring interdependence and the benefits it brings and opposing it for reason of the costs it imposes. It also helps explain why continuous internal party-led political-ideological campaigns ("Anti-Spiritual Pollution," "Resist Bourgeois Influence," etc.) are imposed on the Chinese people and why, in all probability, they should be expected to persist.

The other cost follows from this. Interdependence obviously carries the risk of perceived excessive foreign cultural penetration. As noted previously, every Chinese regime stretching back for several thousand years has been hypersensitive to this possibility. The communist ruling group is hardly an exception. Until the institution of the post-1978 open door policy, the only time foreign cultural influence was allowed into the country in any but token degree was when China was too weak to resist. This was clearly the case during the Warlord and Republican periods, i.e., much of the 20th century. The Mao Zidong-led party came to power in 1949 at least partly on a platform of getting rid of foreign penetration and that policy, implemented strongly thereafter, was generally popular. While modernization has modified this resistance to some extent, anti-foreign feelings still run high among large segments of the populace and the party, if not always the intelligentsia. The question for China, as it has always been, is whether the perceived high cost of foreign cultural penetration can be justified by the benefits stemming from modernization of the country as a whole. The Tiananmen Incident and the repressive policies that followed demonstrate once again that the tolerance of outside cultural influence is still very low.

It follows that, even though the benefits of interdependence are known and admitted, the regime, if forced to choose, will almost always come down on the side of closing the door to the outside and thereby limit the degree to which they perceive China as becoming interdependent. Therein lies the dilemma for the Chinese rulers, of course, for they also know that the road to full modernization runs through a large city called interdependence. So far, no Chinese leadership has found a way to have it both ways, i.e., to modernize, to obtain therewith the benefits of interdependence, and still minimize the perceived costs of foreign cultural penetration. The trouble is that even a relatively small degree of foreign influence appears to produce a highly disproportionate response among the Chinese people in terms of their attitudes toward the communist regime and hence in terms of the ruling group's ability to govern. Tiananmen was, in that regard, a very strong lesson to the leadership and it will not be forgotten soon.

V. Options for China's Future

The "bottom line" is rather easy to describe, if trends extant at the beginning of the 1990s continue. First, China will probably continue a modest degree of interdependence in most spheres, high when compared with the beginning of the 1980s but relatively low in relation to the more highly industrialized nations. Second, the Beijing party leadership will attempt to control the degree of its interdependence in all spheres, lest the combination of domestic opposition and the continual waves of external influence threaten its very capacity to rule, indeed to survive. Much, of course, will depend on the character of various successor leadership groups exercising power after Deng Xiaoping's demise. But barring a breakdown of party rule, a la East Europe, or the re-emergence of liberal reform groups within the party (both relatively unlikely in the judgment of both authors), little change can be expected from China with regard to its attitude and policy toward interdependence, throughout the 1990s. Third, it follows that the Beijing leadership will continue to try to have it both ways: reap the benefits from interdependence and avoid excessive costs. That will not be easy, obviously, since secular trends throughout the globe all point to greater degrees of, and benefits from, interdependence in all spheres, especially the economic. A fourth conclusion therefore is apparent: the disjunction between global trends and Chinese propensities implies that China will not modernize as fast as it could were it to allow interdependence to exert its full influence over the country.

China will not therefore cease to move ahead. But it will fall progressively behind, not only as compared with where it could be but also in relation to the degree of modernity of the other nations of relevance to Beijing. In the long run, the costs of avoiding full-scale interdependence will mount and become increasingly obvious. China will surely be able to live with such costs, as it has always done. But the toll, in terms of lost opportunities and actual burdens imposed upon the Chinese people, will be high. In the medium term, i.e., the decade of the 1990s, that will merely be one more tragedy for China. But beyond the turn of the century, it could, in combination with other, mostly domestic trends, weigh increasingly heavily in favor of a broad popular push to replace the Chinese Communist Party with a non-communist, possibly democratizing successor regime. Such a group could well take interdependence as one of the planks in its program to modernize the country as rapidly as possible.

CHINA'S FOREIGN COMMERCIAL RELATIONS

By Erin McGuire Endean *

CONTENTS

Page

Summary 741

I. Foreign Trade, Investment, and Finance in the 1980s 743

II. A Decade of Trade Reforms and Reversals 744

 A. Beijing Reverts to Administrative Controls in 1988 746

 B. Consequences of the June 1989 Crackdown 747

 C. Beijing Tightens Its Grip 749

III. Foreign Economic Links Recovering 750

IV. The Coming Decade 751

 A. Erratic Import Trends 752

 B. Promising Export Prospects 753

 C. Slower Growth in Foreign Investment 754

 D. Managing a Growing Foreign Debt 755

V. Other Uncertainties Ahead 755

VI. Implications for China 756

TABLES

1. China: Key Imports, 1990 758
2. China's Major Export Commodities, 1985–1990 759
3. China: Foreign Investment Contracts, 1980–1990 760
4. Sources of Foreign Investment in China, 1979 to 1989 761
5. China's Balance of Payments, 1985–1990 762

FIGURES

1. Chinese Trade Trends, 1980–90 763
2. Quarterly Foreign Exchange Reserves, 1985–90 764
3. China: Export Earnings by Foreign-Funded Firms 765
4. China: Prospects for Export Growth in the 1990s 766
5. Growth in Chinese Exports Relative to Foreign World Markets, 1980–90 767

SUMMARY

The coming decade holds many uncertainties for China and, consequently, for Beijing's foreign trade, investment, and financial relations with the rest of the world. Chief among these is the transition to a post-Deng Xiaoping leadership, and the direction economic policies will take under a new regime. Policy liberalization would encourage broader foreign contacts, but Beijing's failure to return to the reform path would probably deter some potential investors and bankers from committing large sums to China projects. Chinese exports will probably continue to grow fairly rapidly whether

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Beijing resumes market-oriented reforms or not, but exports would probably grow more rapidly if Beijing adopts comprehensive reforms that encourage factories to streamline production and to respond quickly to world market forces—and that permit China to improve its access to foreign markets by securing membership in the General Agreement on Tariffs and Trade (GATT). Other important unknowns that will shape China's foreign commercial relations include Western openness to Chinese exports and the willingness of foreign governments, bankers, and businessmen to invest in China, particularly as new markets and investment sites in Eastern Europe are clamoring for funds.

Despite these uncertainties, foreign trade, technology, and financing are certain to become even more important determinants of China's economic growth and modernization in the coming decade than they were in the 1980s. Export markets will become increasingly vital to Chinese factories and workers, and foreign-invested projects will generate a growing share of China's industrial output. Foreign borrowing may grow more slowly if exports continue to perform well and if Beijing retains tight controls on overseas borrowing to keep its nearly $50 billion foreign debt from swelling and to minimize its reliance on foreign funds—a reaction to Western sanctions imposed after the Tiananmen incident. Nonetheless, Beijing will continue to draw on concessional foreign financing for major infrastructural improvements.

One consequence of China's increasingly outward orientation will be the reduction of Beijing's influence over the regions most closely integrated into the global economy. Foreign economic links, for example, have already blunted the impact on coastal provinces of the economic austerity program Beijing has been implementing over the past two years. In Guangdong, China's most outward-oriented province, tighter domestic credit and sluggish domestic demand resulting from austerity policies have encouraged factories to rely increasingly on global markets for their products and on foreign partners for needed investment funds. Accordingly, austerity policies may have actually intensified Guangdong's movement away from central control—the opposite effect Beijing intended.

Beijing's growing trade prowess will make urban coastal areas increasingly vulnerable to a downturn in global economic conditions, however. For example, a slump in Western import demand or a revocation of China's most-favored-nation trading status with the United States could cause Chinese unemployment to balloon and factory losses to mount in export-producing regions. A deteriorating operating environment for foreign investment, or more attractive opportunities elsewhere, might also cause Chinese exports to slow; foreign investment has been one of the most important factors contributing to Chinese export growth in the 1980s. Finally, restrictions on Chinese access to low-interest foreign funds could delay needed port, railway, and energy-sector modernization efforts, and sharply higher interest rates on commercial loans could slow development in the cities and regions that rely on borrowed funds to accelerate industrial growth.

I. FOREIGN TRADE, INVESTMENT, AND FINANCE IN THE 1980S

One of the most striking successes of China's economic reform program has been its transformation from an autarkic economy to one that is increasingly open to international economic forces. After nearly two decades of adhering to an import-substitution strategy that focused on creating domestic industries capable of minimizing China's reliance on outside sources of machinery and equipment, Beijing began, in the late 1970s, to permit imports of equipment and commodities needed to accelerate economic growth. Chinese leaders acknowledged that the transformation of the domestic economy Deng Xiaoping envisioned at the watershed Third Plenum of the 11th Party Congress in December 1978 would require foreign technology, expertise, and funds. A law on joint ventures and the creation of four special economic zones followed in 1979, and a year later Beijing resumed its seats in the International Monetary Fund and World Bank and began to borrow from them as well as to take on commercial debt.

These moves, plus the dismantling of China's cumbersome central trade bureaucracy and the introduction of financial incentives that encouraged traders to export, caused trade to burgeon. Total trade more than tripled from 1980 to 1990 to over $110 billion, equivalent to 41 percent of China's GDP—up from just 12 percent in 1980.[1] Exports averaged 13-percent annual growth from 1980 through 1990, a rate matched during the period only by South Korea, Hong Kong, and Taiwan among major exporters; China became the world's 14th-largest exporter in 1990, up from 23rd place at the beginning of the decade. Legislation and regulations designed to encourage foreigners to invest in high-priority sectors and regions induced foreign partners to sign more than 29,000 investment contracts worth nearly $40 billion, $19 billion of which had been transferred by the end of 1990. China's access to international credit markets dramatically improved, and, accordingly, its foreign borrowing mounted steadily, raising external debt from less than $1 billion in 1978 to roughly $50 billion at the close of the decade.

Open-door policies over the past decade have transformed the Chinese economy and fundamentally altered Beijing's economic relations with the rest of the world. For example, export incentives have encouraged China to specialize in the labor-intensive light industrial goods in which it has a comparative advantage, fueling an expansion of rural industries that specialize in consumer goods production. Imported goods, meanwhile, have improved standards of living and boosted factory productivity and product quality, a process aided by the influx of technical and managerial expertise that has accompanied foreign investment. The impact of China's open door has been particularly pronounced in coastal areas, where 90 percent of the foreign investment and two-thirds of China's trade activities are centered.

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[1] Because China's national accounts are calculated in domestic prices not strictly comparable to the world prices in which its foreign trade statistics are denominated, these ratios cannot, strictly speaking, be compared to the export-to-GDP ratios of more market-oriented economies, such as Taiwan, Japan, or the United States. Nonetheless, the ratios accurately reflect the trend over the last decade of China's economy becoming increasingly exposed to outside influences as a result of growth in the trade sphere having outpaced growth in the domestic economy.

China's appetite for foreign capital and drive for new export markets have influenced Beijing's economic relationships with Asian neighbors as well as with the United States. China and Hong Kong have developed a symbiotic relationship beneficial to both sides; Hong Kong investment—which accounts for two-thirds of the foreign investment in China—has transformed southern China into a series of dynamic export-processing zones, while low-wage Chinese labor has enabled entrepreneurs from the territory to remain competitive in world markets despite soaring wages and shortages of skilled workers. Japan has emerged as China's largest source of loans, supplying nearly three-fourths of borrowed funds. China's economic contacts with South Korea and Taiwan—virtually nonexistent in the first half of the decade—have blossomed. This has propelled closer dialogue between Beijing and Seoul as officials have sought to mediate trade and investment disputes and to provide a new framework for contacts between the countries in the absence of diplomatic relations. Investment by Taiwan firms in China—albeit indirectly—has linked the two economies despite Taipei's continuing proscriptions on direct contacts; investment and travel by Taiwan businessmen helped offset the downturn in investment and tourism from the West following the Tiananmen crackdown on prodemocracy demonstrators. The United States, crucial to China in the first half of the decade primarily as a source of technology and training, has emerged as China's foremost export market, a trend that is likely to dominate the bilateral economic relationship in the coming decade. China's barter trade ties to the Soviet Union and Eastern Europe have grown steadily, particularly at times when hard currency shortages encouraged Beijing to trade with countries that would accept Chinese products, rather than scarce foreign exchange, as payment for imports.

II. A DECADE OF TRADE REFORMS AND REVERSALS

Beijing has attempted three times since 1978 to implement reforms in the trade sector that would expose traders—and factories—to global economic forces and wean them away from state subsidies. Exports have grown fairly steadily over the past decade, but the relaxation in central oversight of imports has led to several spending sprees that caused trade deficits to balloon and foreign exchange reserves to drop precipitously. On each occasion, when the trade deficit grew at an alarming rate or corruption and mismanagement became rife, Beijing has stepped in to regain some of the trade authority it had relinquished.

The first wave of reforms began in 1978, when Beijing began dismantling the unwieldy, Soviet-style trade bureaucracy that for nearly 30 years had given 10 national import and export corporations under China's trade ministry sole authority to sign import and export contracts with foreign firms. Beijing began to permit individual provinces, municipalities, and industrial ministries to set up their own trade entities, undermining the trade ministry's monopoly. At the same time, Beijing undertook a $10 billion import program that centered on purchases of complete plants and equipment from Japan, the United States, and Western Europe. Beijing also opened four special economic zones (SEZs) in southern China to serve as windows on the West by attracting foreign investment and technology and generating exports. Imports ballooned 44 percent in 1979 before cutbacks in domestic investment spending in 1980 reduced demand for capital imports and sparked the cancellation of many of these contracts and the beginning of a three-year readjustment phase.

A second wave of trade reforms began in 1984, when Beijing announced plans to open 14 port cities and Hainan Island to foreign investment. Beijing also permitted local authorities to sign trade contracts and approve foreign investment projects up to a ceiling amount, which varied from region to region. Thousands of independent trading companies sprang up in these cities and in the SEZs. Again, trade burgeoned, producing some unforeseen problems. Many of the independent traders engaged in lucrative—but unproductive—transactions; some, for example, made money by exporting and then reimporting Chinese goods and collecting state subsidies on both transactions. Strong demand for consumer goods such as televisions, tape recorders, and microcomputers caused imports to soar 60 percent in 1985. Another problem surfaced when local officials in the SEZs approved hundreds of hotels and office buildings but failed to attract manufacturing investment. The SEZs became known as centers of real estate and currency speculation, rather than the industrial hubs planned when Beijing funded billions of dollars worth of infrastructural improvements. Beijing curbed the SEZs' autonomy, scaled back foreign investment in "nonproductive" sectors, and reasserted control over the trade sector by closing down more than a thousand independent trading companies after the trade deficit soared to nearly $15 billion in 1985 and a billion-dollar car import scandal on Hainan Island touched off charges of widespread corruption and mismanagement. In addition, Beijing sharply devalued its currency against the U.S. dollar in July 1986, following several years of gradual depreciation.[2]

Beijing began its third round of trade reforms in January 1988, after import growth had successfully been reined in to less than two percent annually for two consecutive years. This round of reforms was centered on developing export-processing enterprises along the coast that would capitalize on China's cheap labor and make use of factories and infrastructure already in place. This plan, dubbed the "export-led coastal development strategy" by its primary proponent, Zhao Ziyang—who was Communist party General Secretary at the time—was timed to take advantage of China's improved export competitiveness resulting from currency appreciation and labor shortages in Japan, South Korea, and Taiwan.

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[2] Beijing saw currency devaluation as a means of reducing its need to subsidize exports of manufactured goods; the currency adjustments had the effect of narrowing the gap between high state-set Chinese prices and the relatively lower prices prevailing internationally for many of these goods. Devaluation was also another means to curb Chinese imports, since it raised the dollar prices on these items. For imported commodities that China could not substantially reduce, Beijing's subsidy burden grew; the central government had to cover the difference between high world prices for grain, steel, and other primary products and the low state-set prices in China.

Two key characteristics differentiated this round of reforms from those in 1978 and 1984. First, unlike the earlier reforms, this round featured the introduction of financial changes, rather than simply decentralized command planning. Beijing granted local branches of central trade corporations greater autonomy over what they exported and imported, replacing volume quotas with contractual targets for earnings and profits. Beijing permitted successful export corporations to retain a higher share of their above-quota hard currency earnings.[3] Second, this round sought to make individual factories more responsive to market forces; the earlier reforms had focused on the next level up—foreign trade corporations. Beijing began billing factories directly for their imports; China implemented an "agency system" under which Chinese customers paid trade corporations a commission for purchases made on their behalf. On the export side, Beijing gave export-producing factories a share of earnings from foreign sales of their products. Beijing also began to permit several hundred export-producing factories to sign sales contracts with foreign buyers directly, bypassing the trade bureaucracy altogether.[4]

A. BEIJING REVERTS TO ADMINISTRATIVE CONTROLS IN 1988

True to form, this latest round of reforms enabled both imports and exports to balloon. The trade balance took a turn for the worse, however, when the domestic economy began to overheat as a result of massive infusions of credit that were intended to spur industrial production. Overly rapid industrial growth and serious shortages of energy and other raw materials drove inflation in urban areas to 30 percent. Beijing turned to foreign suppliers for many of the industrial and agricultural products it could not supply domestically. Imports rose 19 percent in the first half of the year, with purchases of foreign fertilizer, sugar, and cotton rising dramatically.

At the same time, a sharp increase in exports of primary goods—a result of the incentives to trading companies introduced during the third round of trade reforms—was a mixed blessing. Rapid export growth worsened domestic shortages of energy and raw materials and bid up domestic prices.[5] Inflation, in turn, eroded the competitiveness of Chinese products in foreign markets, slowing export growth in the second half of 1988. Chinese Customs statistics indicate that, after growing at a nearly 30 percent rate in the first half of 1988, exports slipped to just over half that pace from July through December 1988. Even China's premier foreign exchange earner, the textile sector, was squeezed; Chinese prices for textile fibers increased about 30 percent in 1988 while international prices for fabrics dropped by 15 percent on average, according to Chinese press reports. Pinched by these price adjustments—and freed from centrally mandated export quotas by the 1988 trade reforms—many factories found it more profitable to sell to the domestic market.

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[3] By 1988, Beijing was permitting exporters of light industrial goods, arts and crafts, and garments to keep 70 percent of their earned foreign exchange and the machine-building and electronics industries to retain 50 percent—in contrast to the roughly 30 percent permitted most other sectors.

[4] Beijing also granted China's special economic zones additional trade and investment privileges, including the right to retain 100 percent of the foreign exchange they earned from exports. Hainan Island received provincial status and became China's fifth SEZ in early 1988.

[5] Because China's domestic price structure severely underprices raw materials and energy, trading companies rushed to export these commodities when Beijing eased control over the foreign trade sector. Exports of pig iron, steel, coal, nonferrous metals, raw silk, and cotton all jumped even though domestic factories were reporting shortages of the same goods. Trade corporations reaped large profits by buying these goods at low prices set by the central government and exporting them at higher international prices.

Beijing included the trade sector in the comprehensive austerity program it began implementing in late 1988 to cool the overheated economy. As with other austerity measures, Beijing's policies essentially invoked administrative measures to regain central control over economic decision making, reversing many of the market-oriented reforms implemented over the previous decade. For example, Beijing recentralized trading authority, slashing by one-third the number of authorized foreign trade corporations and requiring a larger share of imports to be subject to import licenses, import substitution regulations, and bans. Beijing also tightened controls over foreign exchange allocation for imports and imposed new restrictions on the discretionary use of exporters' retained foreign exchange earnings. At the same time, Beijing expanded the number of primary products subject to export licenses, quotas, and bans, and boosted subsidies to exporters of manufactured goods. Beijing also set up chambers of commerce to coordinate sales volumes and prices for similar products exported by more than one trader. To slow the flow of foreign credit to Chinese enterprises that found their access to domestic funds reduced when Beijing cut state investment and curbed bank lending, Beijing tightened its supervision over foreign borrowing, reducing the number of government entities authorized to borrow funds abroad from 100 to only 10.

B. CONSEQUENCES OF THE JUNE 1989 CRACKDOWN

Inflation, shortages of key raw materials, and tight domestic credit had begun to take their toll on exports and had caused foreign investors to scale back expansion plans even before the spring 1989 pro-democracy demonstrations in Tiananmen Square. The country's deteriorating current account balance and mounting debt-service obligations had also led commercial bankers to begin reassessing their lending plans for China. The crackdown accelerated the decline: in the year following Beijing's decision to use force to suppress the demonstrations, China probably lost an additional several billion dollars in tourist revenue, foreign loans and aid, and foreign investment.

One of the areas that suffered most immediately was the tourism industry. China earned $1.8 billion from tourism in 1989—$800 million below the total that had been projected prior to the unrest and 20 percent below the level in 1988. Decreases of 40 percent and 30 percent, respectively, in the number of visitors from Japan and the United States were only partially offset by a 24-percent increase in visitors from Taiwan. The shortfall in tourism earnings forced China to reschedule several foreign loans used to build tourist hotels, moves that may have added to foreign bankers' worries about China's creditworthiness.

International financial institutions and countries with low-interest loan packages pending froze billions of dollars worth of credits, the largest of which were a yen credit from Japan worth $6 billion to support energy, telecommunications, and transportation projects; $780 million from the World Bank; and several hundred million dollars from the Asian Development Bank. Most Western nations also froze government-backed export credits to China.

Although the freeze on long-term official lending had little immediate effect on capital inflows—most of the delayed projects would not have transferred funds to China for several more years—it made commercial bankers more cautious, which had a serious near-term impact. After reevaluating both China's political stability and its creditworthiness, many bankers reduced medium- and long-term commercial loans from earlier projections, scaled back short-term trade credit lines, and raised the interest rates assessed on loans. The international bond market also downgraded China's credit rating. In all, the sanctions renewed caution among commercial bankers, recentralized borrowing authority, and reduced demand for funds under the austerity program caused China to sign less than $5 billion in loan agreements in 1989, half the level of a year earlier. Foreign commercial borrowing dropped by nearly 70 percent.

Beijing drew down its foreign exchange reserves sharply in the weeks immediately after the Tiananmen crackdown. Much of the drawdown can be traced to withdrawals by overseas depositors in Bank of China branches in Hong Kong, Macao, and Singapore. The drop in commercial lending also caused Beijing to use its reserves to pay for imports and make payments on outstanding loan obligations. China's foreign exchange holdings dropped by $3 billion in June and July, to $13.6 billion—barely sufficient to cover three months' imports, a level Beijing generally regards as a minimum.

Foreign investors postponed many of the projects that were under discussion at the time of the crackdown and began to reassess the risks and rewards of operating in China during a period of economic austerity as well as political and social instability. By year-end, foreign investment commitments—which, at $5.6 billion, slightly exceeded the level reached a year earlier—were $2 billion–$3 billion below the level that might have been reached had the pace set in the first half of the year continued.

More broadly, the crackdown also derailed China's efforts to secure membership in the General Agreement on Tariffs and Trade (GATT) before the December 1990 close of the Uruguay Round.[6] Although GATT contracting parties resumed consideration of China's membership request in December 1989 after a six-month delay, many of them had, in the interim, grown increasingly concerned that China was not making progress toward making its economy more compatible with the GATT's free-trade principles and was unlikely to do so anytime soon given the three-year hold on major economic reforms announced by China's leaders. At the same time, China's damaged international image in the wake of the crackdown probably influenced Taipei's decision to apply for GATT membership as an independent customs territory on 1 January 1990, a move that will complicate China's accession negotiations.[7]

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[6] China applied for GATT membership in July 1986 and submitted a memorandum describing its foreign trade regime in February 1987. Since then, members of the working party formed to consider China's application have been reviewing the memorandum and questioning Chinese officials about the compatibility of China's state-dominated economy with the GATT's free trade principles. A key impediment to China's accession is Beijing's insistence that it be admitted to the GATT as a less developed country (LDC), rather than as a nonmarket economy (NME). LDC status would permit Beijing to use high tariffs and quantitative import restrictions to protect infant domestic industries or to reverse balance-of-payments difficulties. GATT membership as a nonmarket economy, however, would have far fewer advantages for China because it would enable other GATT members to retain quotas and other nontariff barriers on imports from China to protect them from a flood of exports at state-set—often subsidized—prices.

C. BEIJING TIGHTENS ITS GRIP

Chinese leaders' concern that foreign exchange reserves might drop quickly as a result of sharp declines in tourism, foreign loans, and foreign investment—as well as the deteriorating trade balance—prompted those in charge of economic policy to further tighten the center's grip on the foreign trade sector after the crackdown. The removal of many of China's most vocal proponents of market-oriented economic reforms from positions of influence after Zhao Ziyang was ousted as General Secretary of the Communist party in June 1989 cleared the way for greater use of administrative measures by advocates of stronger central control.

On the import side, Beijing began to require central approval for purchases of grains, sugar, steel, fertilizers, petroleum, timber, cotton, pesticides, and several other key commodities in July 1989. Chinese leaders subsequently banned imports of 20 electronic and machinery products and some associated assembly lines, boosted tariffs on dozens of other products—in some cases by as much as 100 percent—and subjected hundreds of import goods to stringent new inspection requirements.

Beijing's financial difficulties in the wake of the crackdown also renewed its interest in stimulating exports. Beijing began to provide export-producing factories with priority access to electricity, raw materials, and transportation, as well as increased allocations of credit. In December 1989, Beijing devalued its currency 21 percent against the U.S. dollar, the first change in the state-set exchange rate in more than three years. A second devaluation of nearly 10 percent followed in November 1990, and there are numerous reports that Beijing plans another 10- to 15-percent devaluation for 1991.[8]

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[7] At a minimum, Beijing probably fears that it will have to expend considerable effort persuading GATT members to postpone consideration of Taiwan's membership bid until after Beijing becomes a GATT member—time and effort that could have been spent lobbying for China's membership. Beijing may also be worried that the simultaneous consideration of the two applications could make GATT members even more critical of China's economic system; on economic merits alone, Taipei presents a strong case for membership because it has significantly liberalized its financial and trade system over the past few years. Finally, Beijing probably fears that if Taiwan accedes to the GATT first, Taipei could influence the terms under which Beijing becomes a member.

[8] As with other nonmarket economies where export prices are set by state-owned trading corporations, the link between exchange rates and export competitiveness is indirect. Devaluation is a way for Beijing to limit state subsidies that must otherwise be paid to trade corporations that lose money on government-mandated exports of items—such as manufactured goods—with domestic production costs greater than prevailing international prices when converted to domestic currency at the official exchange rate. Orthodox officials are believed to have endorsed the currency devaluation—postponed in 1988 because of concerns that higher import prices would fuel inflation–because they recognized the need to stimulate exports as well as to reduce government expenditures on export subsidies, which grew sharply in1989 as inflation boosted domestic production costs. Objections to the move had diminished by late 1989 because Beijing had succeeded in bringing the inflation rate down to 6 percent, compared to 27 percent at the beginning of the year.

Immediately after Tiananmen, Chinese officials launched a propaganda campaign to assure businessmen that the country remained open to foreign investment, and at the same time warned foreign investors that Beijing would retaliate if they used the crackdown as an excuse to cancel or suspend already concluded deals. In late 1989, to prop up investor confidence, Beijing began promising foreign investors special allocations of credit and raw materials. China adopted an amendment to its joint-venture regulations in April 1990 that permitted foreigners to function as chairmen of joint ventures in China and allowed firms to operate in perpetuity if so specified in contracts. The amendment also included a pledge from Beijing not to nationalize or expropriate joint ventures.

III. FOREIGN ECONOMIC LINKS RECOVERING

Beijing's reassertion of control over the trade sector brought about remarkable results. Rapid export growth and tough import controls gave China a record $9 billion trade surplus in 1990, compared with a $6.6 billion deficit a year earlier. The slump in the domestic economy was partially responsible for the turnaround because it slashed demand for imports and freed up goods for export. Foreign sales were 18 percent above the level posted in the first eight months of 1989. Imports, meanwhile, dropped 10 percent, with sharp cuts in purchases of synthetic fibers, timber, nonferrous metals, steel, motor vehicles, and consumer goods. China's year-end current account surplus is estimated to have approached $9 billion in 1990.

Hard currency inflows from foreign investment and tourism remain below what they would likely have been without the Tiananmen crackdown, but signs in the second quarter of 1990 pointed to a partial recovery in these areas. Although foreign investors signed only $870 million worth of new contracts in the first quarter of 1990, 42 percent below the level achieved a year earlier, they pledged nearly $1.5 billion worth of new investment in the second quarter—just 2 percent below the level of the second quarter of 1989. The third quarter showed continued improvement, with more than $1.6 billion in new investment contracts. In the final quarter of 1990, China signed an unprecedented $2.6 billion worth of investment contracts with foreign firms, bringing the year-end total—$6.6 billion—to record levels. Investors from the United States and Japan remained cautious about China projects—in many cases testing the waters by signing investment contracts valued at a fraction of their original amount—but investment by Taiwan businessmen made up for much of the slack. Several large European-funded projects, including a $920 million Sino-German automobile joint venture, further bolstered investment levels. Record travel by tourists and businessmen from Taiwan in the first half of 1990—arrivals from Taiwan were up 64 percent as of October—caused a thirteen-percent gain in the total number of tourists traveling to China. Despite China's currency devaluations in 1989 and 1990, which reduced the dollar value of tourism inflows, earnings nonetheless surpassed the 1990 target of $2 billion.

Economic sanctions against China were gradually dismantled in 1990, further contributing to the balance of payments turnaround.

The World Bank began to authorize loans for "basic human needs" in February 1990 and five months later key donor countries agreed to begin considering new Bank loans for projects that would encourage market-oriented reforms. In July 1990, Tokyo lifted its freeze on the massive $6 billion yen-denominated credit program. Many Western governments have resumed export credits for China. The European Community formally lifted its economic sanctions on 22 October. The gradual resumption of lending from multilateral development banks and official creditors, in turn, encouraged commercial lenders to boost lines of credit to China, although Beijing apparently did not take on significant levels of new commercial debt. Altogether, these factors enabled China's foreign exchange reserves to burgeon, reaching $27 billion by year end, nearly double the level posted immediately after the Tiananmen crisis.

IV. THE COMING DECADE

Although China's foreign commercial links are recovering from the post-Tiananmen chill, Chinese leaders do not have a comprehensive strategy for maintaining and enhancing these ties in the 1990s. For one thing, China's leaders, preoccupied since Tiananmen with ensuring social stability and maintaining party control, have focused on near-term solutions to economic problems such as inflation and unemployment that threaten to re-ignite anti-government demonstrations. Externally, their major concerns have been chipping away at economic sanctions and assuring foreign businessmen that China remains open to foreign investment.

Second, they have apparently not yet achieved a consensus on long-range economic strategies. On the domestic side, orthodox officials can claim some successes—sharply reducing inflation and improving China's external accounts—but critics can also point to negative side effects resulting from austerity policies, such as increased unemployment, higher government subsidies, spiraling losses in state enterprises, and reduced tax revenues. Regarding trade policy, although the traditionalists that dominate economic policy making continue to fear that a reduction in central oversight would cause imports to balloon, some Chinese officials are questioning the need for retrenchment policies now that Western sanctions are easing and foreign investment and tourism are recovering. Proponents of looser controls also are concerned that tight import controls are hampering economic growth in industries that use foreign inputs and will harm China's long-term export prospects. They contend that it is unreasonable for a country with factories as outmoded as China's to shut out needed capital equipment imports and that developing countries ought to accept trade deficits incurred to build infrastructure and modernize industries.

Third, these debates are taking place against a backdrop of shifting political alliances among China's aging leaders that could alter the balance of power in Beijing. Deng Xiaoping may be maneuvering to resuscitate his stalled economic reform program. It is unclear whether he will succeed in splitting his more orthodox rivals or exploiting their handling of the economy to regain the initiative. But the trade sector might be a promising target for renewed reform efforts given its strong performance over the past year and Deng's desire to eliminate Western sanctions and attract foreign investment by demonstrating that China's economic reforms are continuing.

Finally, Beijing appears uncertain what its role will be in the post-Cold War world, in particular how changes in the Soviet Union and Eastern Europe will affect China's foreign economic links. Chinese leaders probably wonder if Washington might devalue Beijing's importance as an anchor of the strategic triangle and focus instead on nettlesome bilateral economic friction points. They recognize, moreover, that other reforming economies will place new demands on the investment and low-interest funds available from Western Europe, Japan, and multilateral institutions. China's trade relations with the Soviet Union and East European countries are also undergoing a significant transformation—from barter to hard currency trade—and it is unclear how this will affect exchanges. Beijing is also concerned that the European Community's EC-92 program of market integration will make it tougher for Chinese exports to make inroads in EC markets.

A. ERRATIC IMPORT TRENDS

Without arriving at a grand strategy for external economic relations, boom-and-bust import cycles almost certainly will continue over the coming decade. In the near term Beijing intends to allow imports to rise modestly. Beijing apparently will retain its tight grip over imports, however, and in late 1990 began boosting foreign purchases by instructing its trade corporations what to purchase, and from whom, rather than by dismantling its administrative controls over the trade sector or implementing the systemic price and enterprise reforms needed to encourage factories to make responsible import decisions; China's current leaders are more likely to approve additional requests by factories for foreign exchange allotments and import licenses than to do away with licensing requirements or foreign exchange restrictions altogether. This approach will probably enable Beijing to raise imports at a controlled pace in the near term. Depressed industrial and consumer demand resulting from China's austerity program will also tend to keep imports from rising dramatically until the domestic economy begins to grow more rapidly; the economy grew by only 4.4 percent in 1990, half the average annual rate posted over the previous decade.

If Beijing eases controls over imports as a means of absorbing excess liquidity in the economy, as it did in 1985, or if China's industrial sector picks up, imports could again balloon rapidly because the problems characteristic of China's half-planned, half-reformed economy that caused erratic surges and slumps in imports during the 1980s remain unresolved.[9] It is unclear when—or if—

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[9] Without administrative controls, Chinese traders would rush to import goods rather than seek suitable domestic substitutes because China's overvalued currency makes foreign goods relatively cheaper. Imports of machinery and consumer goods would grow most rapidly; these items can be sold domestically for a substantial windfall because China's skewed domestic price structure assigns excessively high prices for manufactured goods. Factories make purchasing decisions with little regard for long-term considerations such as expected earnings because they do not face hard budget constraints; Beijing is loathe to institute bankruptcy proceedings against unprofitable factories.

China will have leaders that are committed to, and capable of, implementing the vast array of reforms needed to prevent sudden import surges from following a reduction in central oversight of trade decision making.

B. PROMISING EXPORT PROSPECTS

It appears that China will be able to sustain double-digit annual export growth throughout most of the 1990s, although growth in some years may slow to less than 10 percent and in others accelerate to more than 20 percent.

China's potential as a high-volume producer of labor-intensive products sold at prices well below those offered by its competitors is immense, and still largely untapped. China's labor force of some 160 million in the relatively well-developed urban coastal areas that produce more than two-thirds of China's exports is larger than the labor forces of Japan and the Asian Newly Industrializing Economies combined. Wages remain low relative to those prevailing in China's competitors, averaging less than $2 per day in urban state-owned factories.

Moreover, the dynamic non-state sector is becoming an increasingly important source of China's exports. Rural industries have proven themselves adept at making inroads in foreign markets; according to the Chinese press, China now has more than 300,000 export-oriented rural enterprises, up from just 1,500 in 1980. Last year, these enterprises exported $12.5 billion worth of goods, one-fifth of China's total exports. Moreover, these factories have demonstrated their ability to maintain rapid export growth even under adverse conditions; in 1990, despite Beijing's deliberate discrimination against these factories in allocating credit and raw materials, exports by rural collective industries grew by nearly a third.

Further, reform-minded officials and traditionalists agree that exports are vital to the country's long-term modernization strategy, and have been able to set aside differences to unite in efforts to promote exports. Most recently, Beijing instituted new trade reforms designed to spur exports and reduce export subsidies in January 1991, despite continuing differences over domestic economic policy.

Beijing will probably achieve export growth regardless of whether it maintains closer central controls over the economy or reinstitutes more market-oriented policies. Productivity-enhancing reforms contributed to China's export boom in the 1980s. But Beijing's reassertion of controls over the economy in 1989 also boosted exports by slowing domestic demand, freeing excess consumer products, industrial equipment, and construction materials for export. Beijing's greater supervision over raw materials allocation—and export—boosted supplies to factories and thus enabled China to increase exports of value-added industrial goods. Tighter central supervision also helped Beijing boost export prices and curb the cutthroat competition that under trade reforms had trimmed export earnings. Exports could grow more rapidly if a new reformist leadership emerges and successfully implements trade reforms in tandem with comprehensive domestic economic reforms that include price decontrol and bankruptcy measures. These measures could prod factories to improve efficiency as well as encourage them to respond quickly to changes in world demand. Comprehensive reforms would over time enable Beijing to avoid a recurrence of the boom/bust cycle that occurred in 1988 and early 1989 when Beijing gave traders more autonomy over their exports without adopting enterprise and price reforms that would hold them accountable for profits and losses.

In part, China's promising long-term export prospects result from the massive investment and technological improvements—both domestic and foreign—that were made in export-producing factories in the latter half of the 1980s. China has more than 12,000 foreign-invested enterprises that produce for export. In 1990, they generated foreign sales of $8 billion, up nearly 60 percent from a year earlier. Apart from equity investments, some 50,000 Chinese enterprises are now assembling export goods using foreign-supplied materials; in 1990 they generated $12 billion in export earnings—one-fifth of China's total exports. Furthermore, export growth in the 1990s will be sustained by the thousands of export-oriented co-production agreements initialed between Chinese and foreign firms in recent years, many of which are only beginning to produce for export. Even if foreign investment in large, technology-intensive operations slumps for the next few years in the wake of the Tiananmen crackdown, small labor-intensive operations will doubtless remain attractive to many new investors because of China's low wage rates.

Domestic investment in export-generating factories over the past few years will also probably sustain export growth into the mid-1990s, when many of the new facilities begin exporting. Capital construction expenditures in the textiles, consumer electronics, plastics, chemicals, food processing, and metalworking industries ballooned in 1987 and 1988, and the same sectors installed $10 billion–$15 billion worth of foreign equipment during the same timeframe. Export growth later in the coming decade could slow, however, if Beijing maintains its current restrictions on capital goods imports for several more years.

C. SLOWER GROWTH IN FOREIGN INVESTMENT

Foreign investment will continue to grow. Some investors from Japan, Western Europe, and the United States may delay major commitments for large, technology-intensive ventures, although many will doubtless try to keep their options open by signing investment contracts for small ventures that can be used to test the waters. Larger, more risky ventures may have to await a verdict on Beijing's handling of the volatile transition to a post-Deng Xiaoping leadership. China's attractiveness as an investment site will be influenced by the direction economic policy takes at that time as as well as by the degree of unrest among workers and students. Prolonged periods of political and social instability almost certainly would disrupt factory production and exacerbate transportation bottlenecks, dimming China's chances of attracting foreign investment. China's ability to attract overseas Chinese investment nevertheless will buoy export performance over the next few years. Asian investors, particularly from Taiwan, will remain keen on small, labor-intensive manufacturing operations that produce for third-country markets.

D. MANAGING A GROWING FOREIGN DEBT

China's experience following the Tiananmen crackdown, when many governments suspended new loans to China and commercial bankers slashed lines of credit, will probably lead Beijing to reinvoke the rhetoric of self-reliance to justify scaled back foreign borrowing over the next few years. In reality, China's strong external accounts have reduced Beijing's need for new foreign loans over the next few years, particularly from commercial banks, which—despite the improvements in China's balance of payments—will probably keep interest rates above their pre-Tiananmen levels while political stability remains tenuous. Yet, China will probably continue to borrow judiciously from multilateral lending institutions and from foreign governments that offer concessional interest rates and extended timetables for repayment.

Without major new demands for short-term foreign loans, Beijing is unlikely to have difficulty making payments on its roughly $50 billion foreign debt over the next few years.[10] China's debt-service ratio is about 10 percent, according to International Monetary Fund estimates, well within manageable levels. Even in 1992, the year that debt repayments peak, China should have no difficulties meeting its obligations, provided its exports continue to post strong growth and China does not experience another foreign credit crunch like the one that occurred following the Tiananmen crackdown. China's healthy level of foreign exchange reserves provides Beijing added protection even if exports falter or additional social unrest reduces China's access to foreign funds.[11]

V. OTHER UNCERTAINTIES AHEAD

A variety of external factors will influence how China's foreign economic relations unfold. The pace of the dismantling of Western sanctions imposed after the Tiananmen crisis will affect China's access to Western credits and export markets. The restrictions on World Bank lending to China limiting loans to those that promote market-oriented reforms leave much leeway for interpretation, and could make the difference between whether China receives several hundred million or more than $1 billion a year in low-interest loans. Failure to receive MFN status from the United States when it comes up for annual review would hurt China's trade balance because China's exports to the United States—its primary export market—would drop. A steep drop could, in turn, cast doubts on China's ability to repay its foreign debts.[12]

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[10] Estimates of China's foreign debt as of the end of 1989 vary considerably, ranging from the official Chinese figure of $43 billion to International Monetary Fund estimates of $51 billion. The Chinese statistics are likely understated because they fail to tally all loans taken on by local-level entities—some of which doubtless have occurred without either Beijing's knowledge or approval—and because they do not include suppliers credits of less than 90 days. The IMF numbers and comparable OECD data estimated on the basis of creditor information may overstate China's debt, however, because they sometimes include the value of short-term lines of credit instead of amounts actually drawn. Moreover, they may include some borrowing by foreign joint-venture partners.

[11] China is not expected to use its hefty foreign exchange reserves to prepay a portion of its outstanding foreign debt. Foreign debt held by the central government, which constitutes about one-third of outstanding debt, is primarily on concessional terms; it makes no sense to prepay loans that carry below-market interest rates. Another third of the debt is commercial; repayment of these obligations is not the central government's responsibility—it is the responsibility of the enterprises and localities that incurred, or guaranteed, the debts. The trade finance and commercial loans that comprise the remaining third also are not generally the responsibility of the central government.

The pace of China's anticipated export growth will also be influenced by whether or not—and on what terms—China secures membership in the GATT. In the near term, provisional GATT membership would probably not increase China's access to foreign markets much because it would permit other GATT members to continue imposing quantitative restrictions and other nontariff barriers on Chinese products as long as Beijing's economy remains state-dominated. If Beijing becomes a GATT contracting party—and is able to persuade other GATT members that market reforms in China have evolved to the point that safeguards are no longer necessary—Beijing's exports could grow by as much as 15 to 20 percent annually.

Exports and foreign investment would also receive a boost if China becomes eligible for U.S. trade privileges under the Generalized System of Preferences (GSP), as it wishes. GSP status would encourage other economies that want to make inroads in the U.S. market to boost their investments in export-producing factories in China. Businessmen in Taiwan, South Korea, Singapore, and Hong Kong—economies "graduated" from their GSP eligibility in 1987—would be especially responsive to a change in China's status.

Other uncertainties are the health of the world economy—particularly given higher oil prices resulting from the Gulf crisis—and global demand for, and openness to, the types of manufactured goods China will export. China's ability to draw foreign investment and loans, moreover, will be influenced by the relative attractiveness of the new markets and investment sites opening up in Eastern Europe and the Soviet Union. Finally, Taipei's willingness to permit investment and trade ties to the mainland will be increasingly important to Beijing; in 1990, investment contracts signed by Taiwan businessmen were second only to those from Hong Kong. If Taipei permits investment in China—even indirectly—by large, technology-intensive ventures moving offshore to escape the island's environmental protection regulations and high operating costs, China could become a more efficient producer and more competitive exporter of products such as chemicals, plastics, and steel.

VI. IMPLICATIONS FOR CHINA

If foreign demand for Chinese products remains strong, foreign investors remain active in China, and foreign governments and bankers restore lending activity at least to pre-Tiananmen levels, standards of living in the coastal regions that are most open to outside economic influences will rise, and the gap between these provinces and the more closed inland regions will widen. This trend could probably occur regardless of whether Beijing maintains retrenchment policies or accelerates economic reforms; even under austerity policies, the economies of China's coastal provinces have grown more rapidly than those in the interior. Moreover, even China's more orthodox leaders have found it difficult to argue against special treatment for coastal regions. Premier Li Peng, for example, reversed his original position and began trumpeting the importance of China's special economic zones in his March 1990 work report to the National People's Congress, a move probably designed to align himself with policies that enjoy broad popular support.

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[12] The conditions Congress may attach to renewal of China's MFN status would make future eligibility less predictable. This uncertainty, in turn, is probably already reducing China's attractiveness as a site for foreigners to invest in factories producing goods exported to the United States; investors are doubtless concerned that if Beijing failed to receive MFN status, goods produced in China would be uncompetitive in the United States because tariffs would increase as much as tenfold.

Another consequence of China's increasingly outward orientation will be the reduction of Beijing's influence over the regions most closely integrated into the global economy. Foreign economic links, for example, have already blunted the impact on coastal provinces of the economic austerity program Beijing has been implementing over the past two years. In Guangdong, China's most outward-oriented province, tighter domestic credit and sluggish domestic demand resulting from austerity policies have encouraged factories to rely increasingly on global markets for their products and on foreign partners for needed investment funds. Firms found they needed to export to grow and they needed foreign partners to help upgrade export quality and penetrate foreign markets. According to the Guangdong statistical bureau, the province's industrial output grew nearly 17 percent in 1990, largely as a result of the stellar performance of foreign-invested firms, whose output nearly doubled. According to Chinese press reports, foreign-funded enterprises now produce nearly one-third of Guangdong's industrial output and generate more than 40 percent of the province's export revenues. Accordingly, austerity policies may have actually intensified Guangdong's movement away from central control—the opposite effect Beijing intended.

Beijing's growing trade prowess will make urban coastal areas increasingly vulnerable to a downturn in global economic conditions, however. For example, a slump in Western import demand or a revocation of China's MFN trading status with the United States could cause Chinese unemployment to balloon and factory losses to mount in export-producing regions. Exports could also slow if foreign investors do not transfer the technologies China needs over the next few years to remain competitive with other Asian exporters of more sophisticated manufactured goods. Restricted access to low-interest foreign funds could delay needed port, railway, and energy-sector modernization efforts, and sharply higher interest rates on commercial loans could slow development in the cities and regions that rely on borrowed funds to accelerate industrial growth.

TABLE 1.

China: Key Imports, 1990

	Value[a] (Billion US $)	Percent of Total[b]	Percent Change from 1989[b]
Total	53.4	100	-10
Specialized machinery	4.6	9	-19
Iron and steel	2.8	5	-52
Textile yarn and fabrics	2.6	5	-9
Grain	2.5	5	-18
Telecommunications equipment	1.8	3	0
Electrical machinery	1.8	3	-25
General industrial machinery	1.7	3	-28
Transport equipment	1.7	3	12
Power generating equipment	1.6	3	19
Textile fibers	1.5	3	-35
Petroleum	1.4	3	-4
Resins and plastics	1.3	2	-43
Road vehicles	1.2	2	-18
Manufactured fertilizers	1.1	2	9
Organic chemicals	1.0	2	-28
Metal ores and scrap	1.0	2	28

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[a] Yearend projections based on official Chinese Customs statistics available for January through September 1990. Imports are c.i.f.

[b] January through September 1990.

TABLE 2.

China's Major Export Commodities, 1985-90

Million US $

	1985	1986	1987	1988	1989	1990	Average Annual Growth Rate, 1985-90
Textile yarn and fabrics	3,277	4,282	5,790	6,456	6,994	6,742	16
Clothing	2,079	2,969	3,749	4,872	6,130	6,706	26
Petroleum and petroleum products	6,766	3,207	4,003	3,372	3,581	3,792	-11
Miscellanous articles	874	1,266	1,326	1,675	2,283	2,641	25
Telecommunications equipment	93	252	503	789	1,140	1,758	80
Vegetables and fruit	839	1,113	1,290	1,617	1,623	1,659	15
Footwear	260	335	465	727	1,096	1,619	44
Manufactures of metals	430	563	797	1,006	1,210	1,451	28
Fish and shellfish	288	500	721	969	1,039	1,419	38
Nonmetallic mineral manufactures	229	322	439	579	793	1,285	41
Electrical machinery and parts	120	191	336	571	819	1,267	60
Iron and steel	118	167	422	1,010	709	1,091	43
Textile fibers	1,156	1,165	1,506	1,672	1,546	1,005	-3

Note: Data are f.o.b. Commodities listed represent products for which China's 1990 exports exceeded $1 billion.

Source: Official Chinese Customs statistics. Data for 1990 are projected using data available through September.

TABLE 3.

China: Foreign Investment Contracts,[a] 1980-90

	Number of Contracts	Value (Million US $)
1980	344	1,675
1981	981	1,328
1982	465	1,125
1983	470	1,732
1984	1,856	2,651
1985	3,073	5,932
1986	1,498	2,834
1987	2,233	3,709
1988	5,945	5,297
1989	5,779	5,600
1990	7,236	6,570

Source: State Statistical Bureau of the People's Republic of China, as published in annual statistical yearbooks and in the Chinese press.

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[a] Includes joint oil development contracts.

TABLE 4.

Sources of Foreign Investment* in China, 1979 to 1989
(Contracted Value)

Million US$

	1979-84	1985	1986	1987	1988	1989	Cumulative total	Share of total
National total	10,327.5	6,333.2	3,330.4	4,319.1	6,190.7	6,294.1	36,795.0	100.0
Hong Kong, Macau	6,494.6	4,134.3	1,773.4	2,364.7	4,161.2	3,734.0	22,662.2	61.6
United States	1,025.0	1,152.0	541.5	361.5	384.3	654.9	4,110.2	11.2
Japan	1,158.0	470.7	282.8	386.3	370.6	515.4	3,183.7	8.7
Singapore	117.0	75.5	140.8	79.8	136.9	147.7	697.7	1.9
Germany	141.8	20.3	55.6	139.6	69.2	159.6	586.1	1.6
United Kingdom	334.0	44.3	51.7	28.6	56.4	33.3	548.2	1.5
France	212.6	49.9	11.9	73.8	32.9	17.6	398.6	1.1
Italy	113.0	24.5	91.6	19.4	22.9	63.3	334.7	0.9
Canada	65.6	8.7	91.0	34.3	39.5	49.1	288.3	0.8
Australia	91.2	14.1	31.6	47.4	17.4	83.7	285.3	0.8
Netherlands	2.0	2.7	0.3	0.1	153.3	17.7	176.1	0.5
Thailand	25.8	14.6	13.2	4.5	41.7	56.8	156.6	0.4
Switzerland	22.2	0.7	25.0	57.1	38.7	11.8	155.6	0.4
Austria	0.0	0.0	90.1	0.9	3.4	9.4	103.8	0.3
Philippines	6.4	40.6	3.8	30.5	15.5	4.7	101.5	0.3
Belgium	50.1	2.7	0.3	1.7	0.6	21.2	76.5	0.2
Sweden	32.9	5.0	0.0	5.3	0.8	27.6	71.6	0.2
Denmark	3.0	3.6	42.6	0.6	0.5	0.0	50.2	0.1

Note: Includes equity and cooperative joint ventures, wholly foreign-owned enterprises, joint offshore oil exploration, leasing, compensation deals, and processing and assembly.

Source: Business China, 25 June 1990.

TABLE 5.

China's Balance of Payments, 1985-1990

Billion US $

	1985	1986	1987	1988	1989	1990
Current account	**-11.4**	**-7.0**	**0.3**	**-3.8**	**-4.3**	**8.5**
Trade balance	-13.1	-9.1	1.7	-5.3	-5.6	7.0
Exports	25.1	25.8	34.7	41.0	43.2	51.0
Imports	38.2	34.9	36.4	46.4	48.8	44.0
Nontrade income (net)	1.5	1.7	1.7	1.1	0.9	1.1
Unrequited transfers (net)	0.2	0.4	0.2	0.4	0.4	0.4
Capital account	**9.0**	**5.9**	**6.0**	**7.1**	**3.7**	**1.5**
Long-term capital (net)	6.7	8.2	5.8	7.1	5.4	5.5
Short-term capital (net)	2.3	-2.3	0.2	0.1	-1.5	-4.0
Change in reserve assets	**-2.4**	**-1.3**	**6.3**	**3.3**	**-0.5**	**10.0**
Memo items:						
Total external debt	16.7	22.8	31.0	40.9	41.3	45.4
Tourism receipts	1.3	1.5	1.9	2.2	1.8	2.0
Foreign direct investment inflows	2.0	2.2	2.3	3.2	3.3	3.4
Foreign direct investment outflows	0.3	0.3	0.6	0.9	1.0	1.3
Yearend foreign exchange reserves	11.9	10.5	15.2	17.5	17.0	27.0

1. Merchandise trade data are based on Customs statistics, adjusted in accordance with balance-of-payments specifications.

2. Nontrade income includes shipment fees, tourist revenues, investment income, labor contracts, and other nontrade services.

3. Official unrequited transfers include grants and donations to and from international organizations and foreign governments; private transfers include remittances and payments from abroad by residents.

4. Long-term capital carries a maturity of one year or longer. It includes foreign direct investment; portfolio investment; international organization and foreign government loans; loans to Chinese banks, government agencies, and localities, deferred payments and collection; processing, compensatory trade and leasing payments; Chinese loans abroad; and other long-term capital.

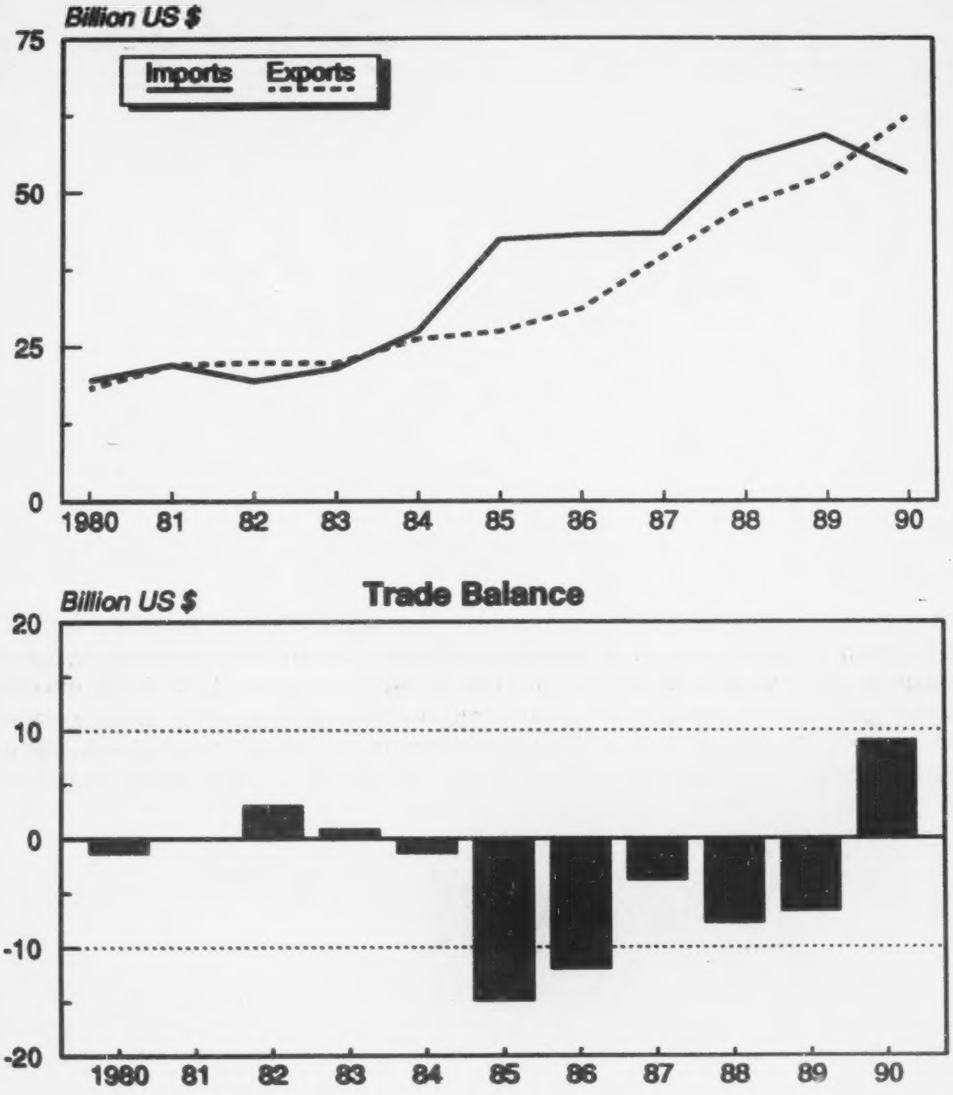
5. Short-term capital includes loans to Chinese banks, government agencies, and localities; deferred payments and collections; and other capital to be repaid within one year.

6. Change in reserve assets: in this table, contrary to standard practice, a negative number denotes a drawdown in foreign exchange reserves; a positive number indicates an addition to foreign exchange reserves.

Source: China's State Administration of Exchange Control (1985-89) and CIA estimates (1990).

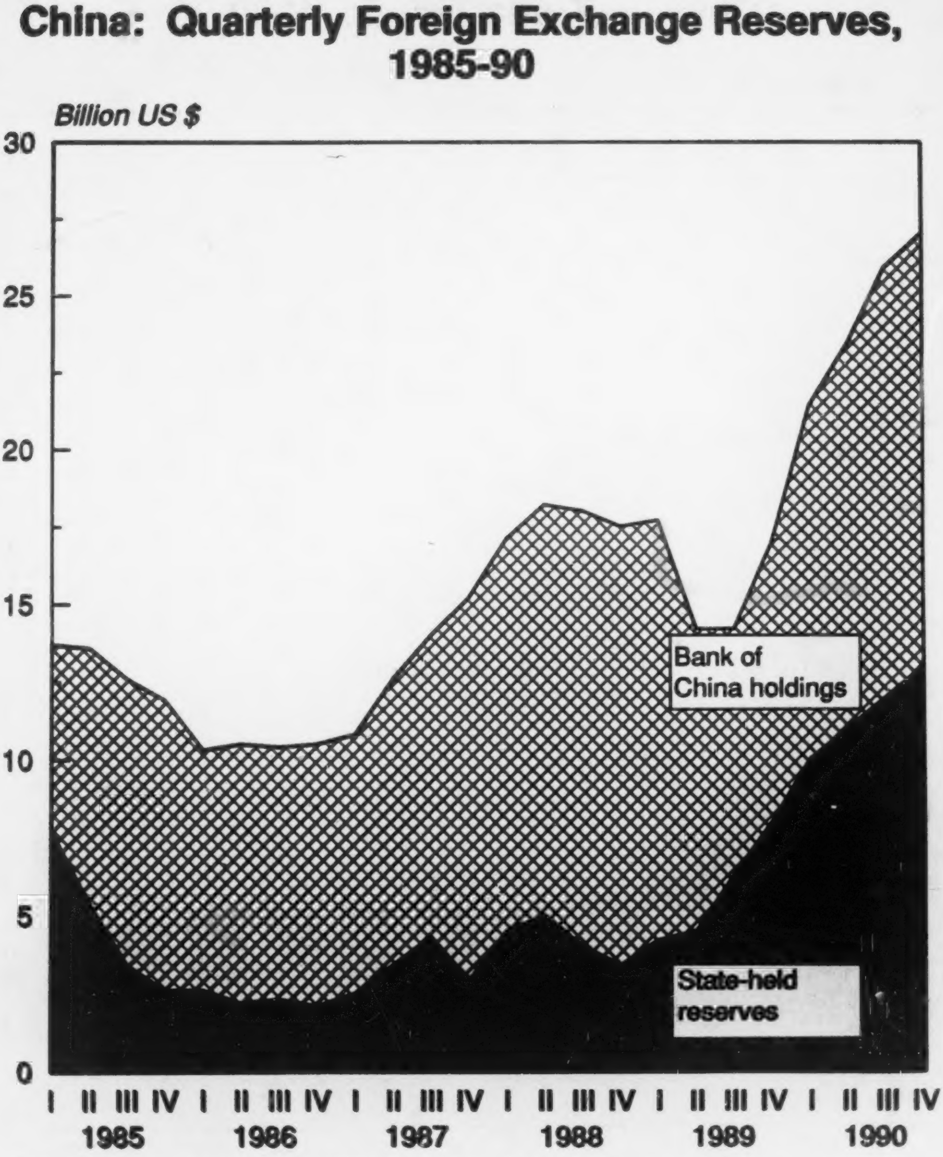
FIGURE 1.

Chinese Trade Trends, 1980-90



Note change in scales.

FIGURE 2.



Note: State-held reserves and Bank of China holdings for the last four quarters are estimated. All other data are from official Chinese statistics.

FIGURE 3.

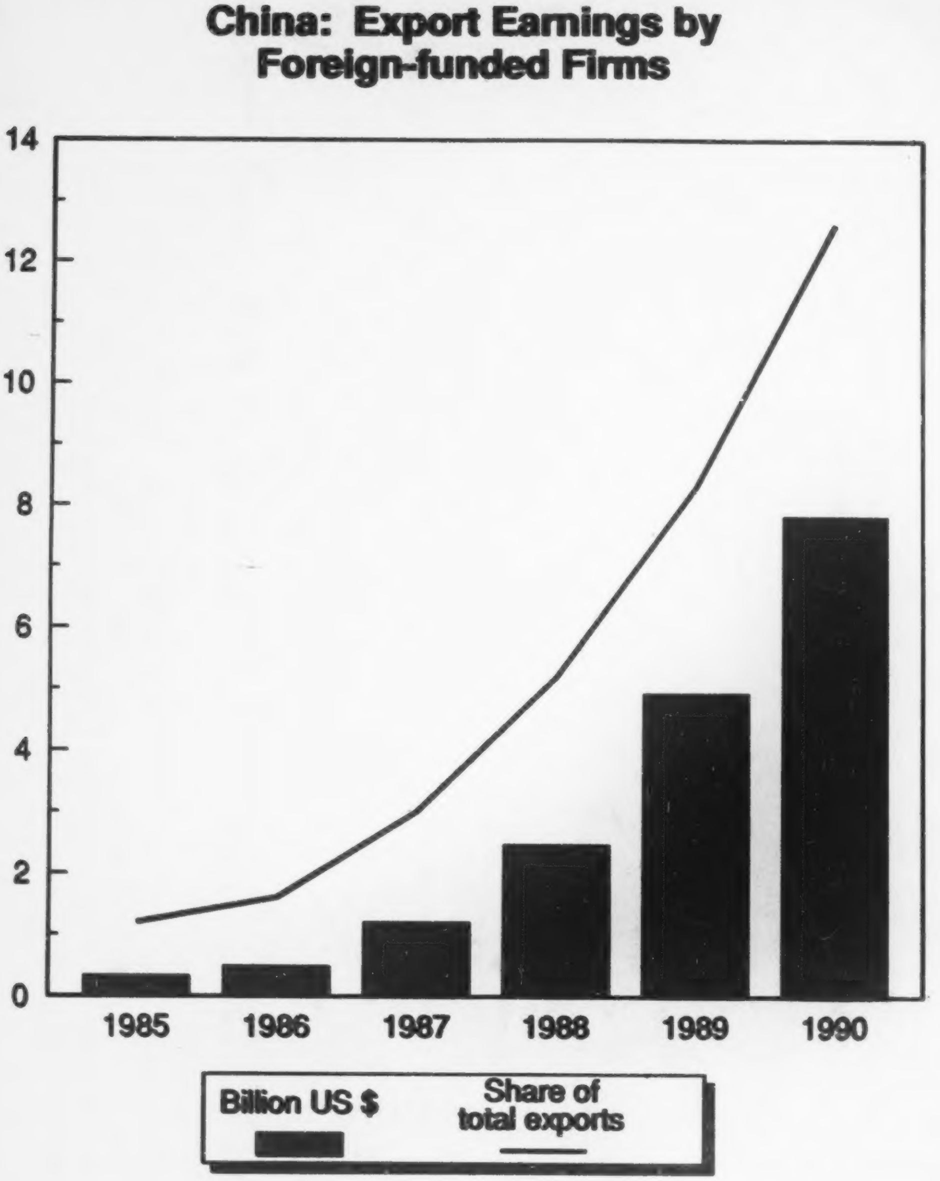
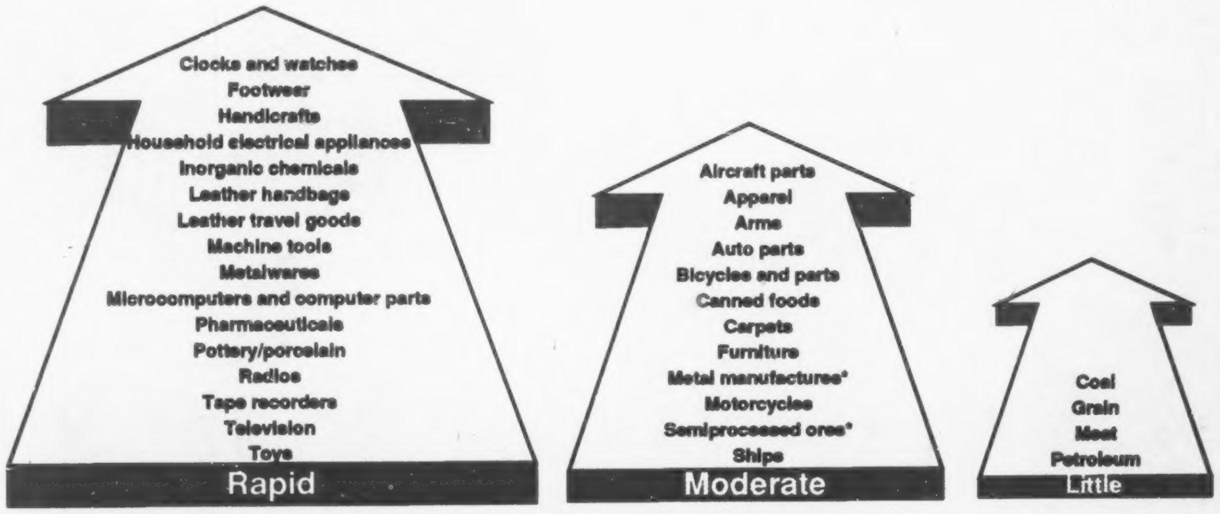

China: Export Earnings by Foreign-funded Firms
14
12
10
8
6
4
2
0
1985
1986
1987
1988
1989
1990
Billion US $
Share of total exports

FIGURE 4.

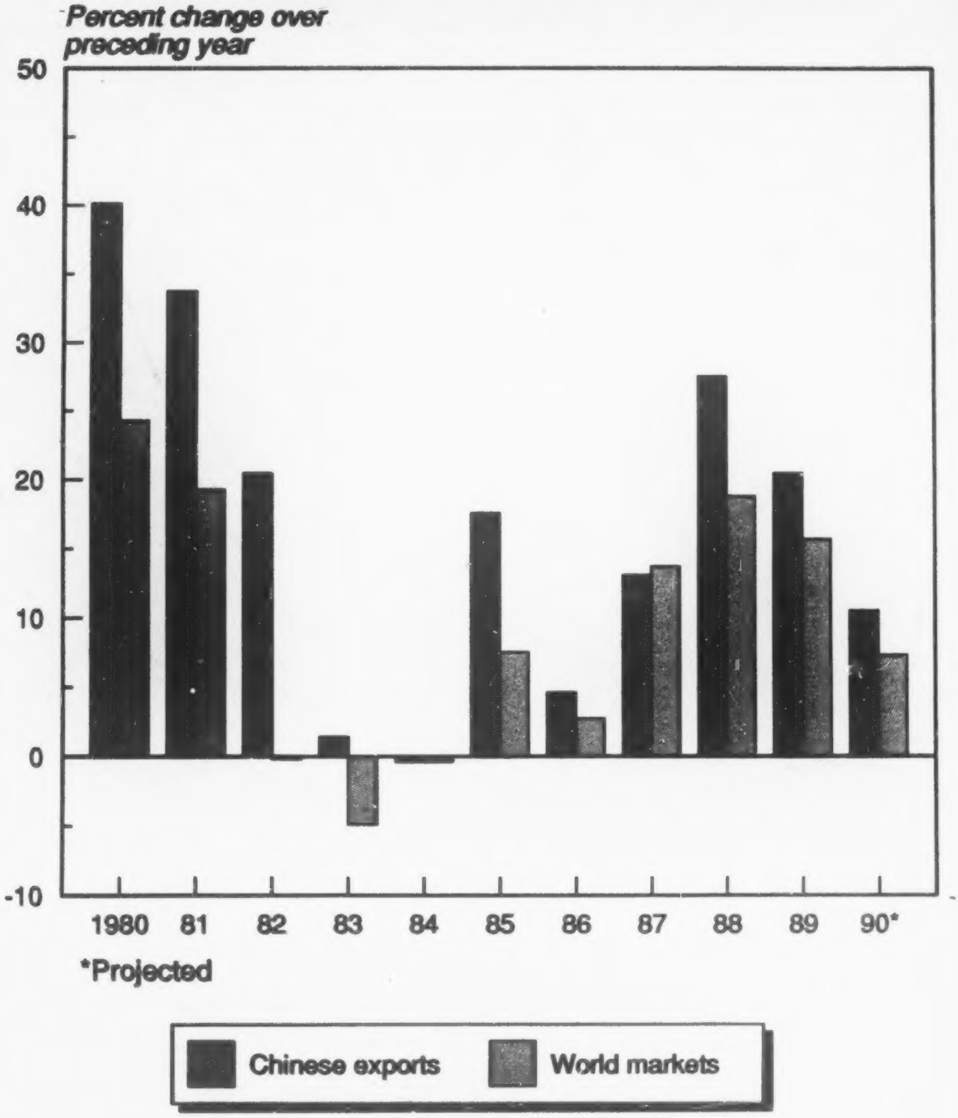
China: Prospects for Export Growth in the 1990s


Clocks and watches
Footwear
Handicrafts
Household electrical appliances
Inorganic chemicals
Leather handbags
Leather travel goods
Machine tools
Metalwares
Microcomputers and computer parts
Pharmaceuticals
Pottery/porcelain
Radios
Tape recorders
Television
Toys
Rapid
Aircraft parts
Apparel
Arms
Auto parts
Bicycles and parts
Canned foods
Carpets
Furniture
Metal manufactures*
Motorcycles
Semiprocessed ores*
Ships
Moderate
Coal
Grain
Meat
Petroleum
Little

*Export growth will be more rapid if China's domestic prices remain far below prevailing world market prices; exports will, conversely, grow more slowly if inflation or price reforms bring Chinese prices more in line with world prices.

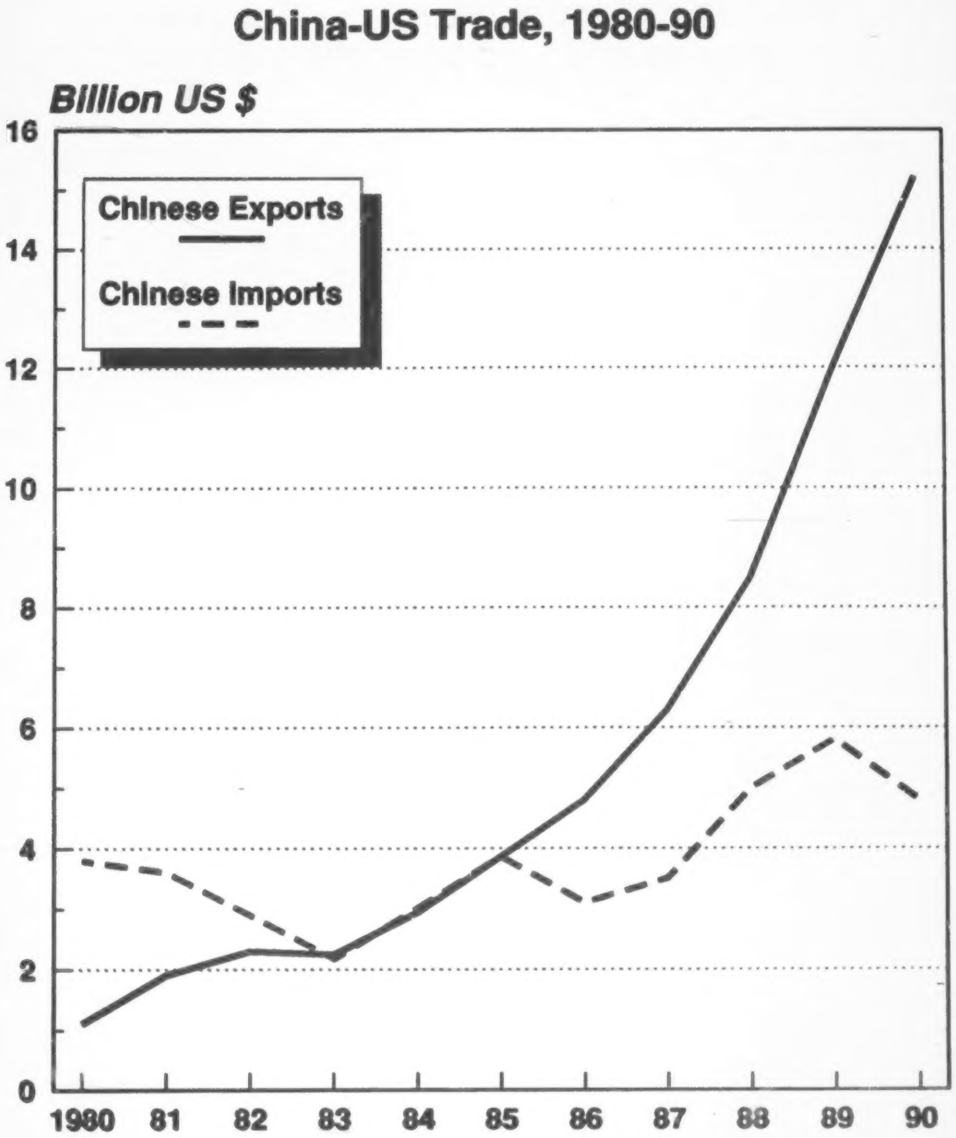
FIGURE 5.

Growth in Chinese Exports Relative to Growth in World Markets, 1980-90



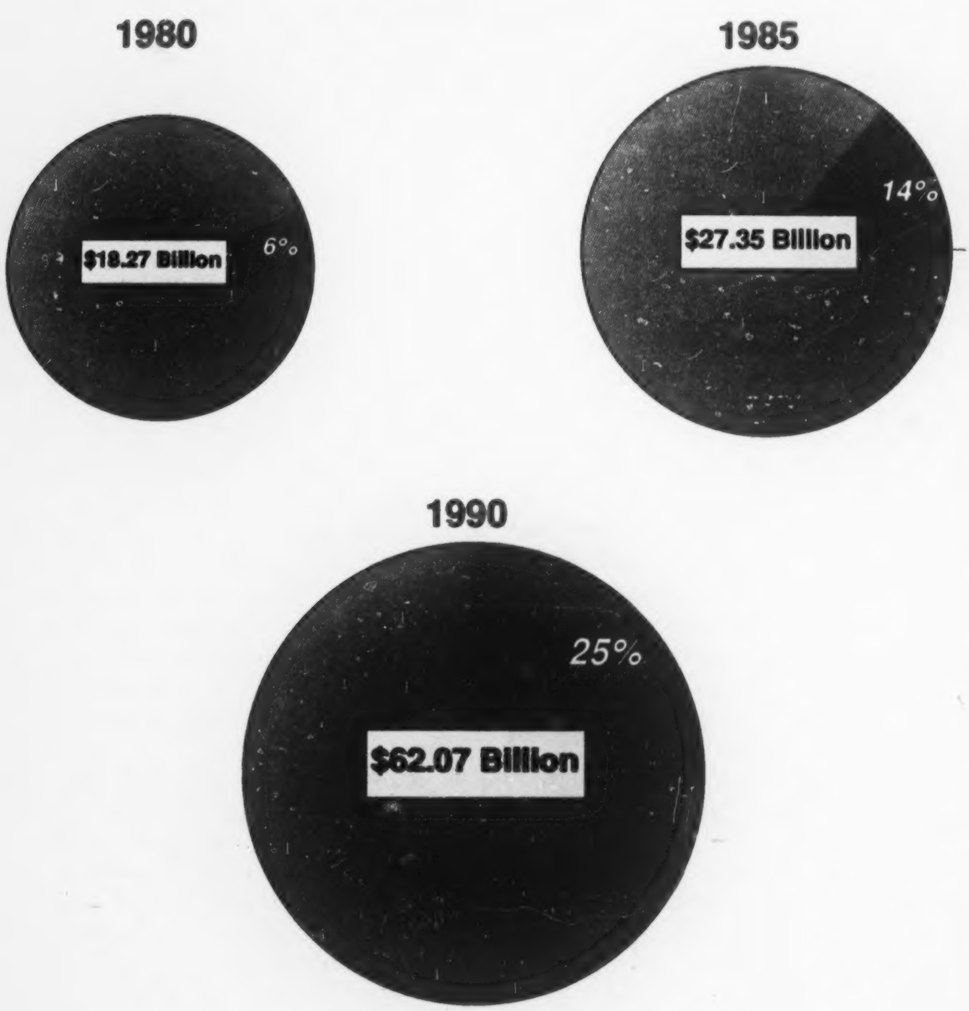
*Projected

FIGURE 6.



Source: US Commerce Department

FIGURE 7.



Growing Chinese Export Dependence on the US Market

Percent of total going to US market

THE BUSINESS CLIMATE IN CHINA: HALF EMPTY OR HALF FULL?

By Martin Weil *

CONTENTS

	Page
I. A Decade of Liberalization and Expansion	770
II. Problems in the Business Environment	773
III. The Business Environment Prior to June 4, 1989	779
IV. Business Post-Tiananmen	781

I. A DECADE OF LIBERALIZATION AND EXPANSION

When Deng Xiaoping took power in 1978, the range of China's economic relations with the outside world was small. China accepted neither foreign debt nor foreign investment. Foreign trade stood at only $20.6 billion per year,[1] less than that of the island of Taiwan .[2] Only a few foreign companies had permanent representation in China.

All trade was conducted through a handful of foreign trade corporations (FTCs) directly controlled by the central government's Ministry of Foreign Trade (now known as the Ministry of Foreign Economic Relations and Trade, or MOFERT). Import and export volumes were determined by the State Planning Commission's annual plan. Imports were viewed as a residual way to fill in shortages of raw materials for production under the state plan or to provide select plants and equipment that China did not possess. Exports were viewed as a means to generate the cash to pay for imports.

The Chinese use the term "gaige kaifang" (reform and opening to the outside world) to describe the guiding policy of Deng Xiaoping's reign. "Kaifang", meaning "opening up", succinctly defines the progressively greater integration of China's economy with the world economy, and the weakening of the view that foreign trade is merely a residual to a closed domestic economic system. The impact of "kaifang" can be seen from a number of indicators:

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* US-China Business Council for US-China Joint Economic Committee 1990 Compendium.

[1] State Statistical Bureau of the PRC, China Statistical Yearbook, 1988, (China Statistical Information & Consultancy Center, Beijing & Hong Kong, 1988), p.643.

[2] Republic of China Council for Economic Planning and Development, *Taiwan Statistical Data Book*, Taibei, 1988.

The 16.6 percent per year growth in China's trade from $20.6 billion in 1978 to 111.6 billion in 1989. Foreign trade grew to 28 percent of China's GNP, according to World Bank statistics.[3]

The relaxation of the strictures against foreign borrowing. By the end of 1989, China's debt had ballooned to a total of $44 billion, including approximately $4 billion from the World Bank, $7 billion from foreign governments, and the remainder from commercial banks.[4]

The absorption of $15.5 billion in direct foreign investment. Approximately 22,000 joint ventures or wholly-owned subsidiaries of foreign companies were established in China during the 1980's.[5]

The proliferation of Chinese organizations authorized to engage in direct contact with foreigners. The list expanded to include hundreds of foreign trade corporations under provincial governments and production ministries and thousands of individual enterprises, large and small.

The establishment of thousands of representative offices of foreign companies in China.

The economic integration of large parts of Guangdong Province with Hong Kong and thus with Hong Kong export markets, as Hong Kong companies moved their manufacturing operations in droves to the Pearl River Delta counties. By the end of the decade, coastal Fujian showed signs of becoming to Taiwan what the Pearl River delta had already become to Hong Kong.

The flow of Chinese investment abroad, in part to guarantee the availability of foreign raw materials. Chinese entities acquired significant stakes in North American oil refineries, chemical plants, and timber products facilities, as well as an Australian iron ore mine, and Hong Kong air transport and telephone companies.

HISTORY OF CHANGE

The changes in China's business climate in the 1980s did not follow a detailed master plan, but took place in fits and starts. Many of the most radical developments, such as the rapid growth of export-oriented township and village enterprises, were not even foreseen by the leadership. In retrospect, however, there were several consistent, important trends that can be said to characterize the entire decade: the development of institutions and a legal system to bring China in line with ways of doing business elsewhere in the world; the decentralization of political and economic power; and the steady erosion of ideological taboos against the West. The changes can be divided roughly into the following periods:

1979–1982. Basic concepts of the open policy were formulated, including:

- The promulgation of a Joint Venture Law and tax laws.

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[3] State Statistical Bureau of the PRC, "Statistics for China's National Socio-Economic Development in 1989", *Beijing Review*, Feb. 26–Mar 4, 1990, supplement p. vi. See also World Bank, China Operations Division, *China: Country Economic Memorandum. Between Plan and Market*, Washington DC, May 1990, p. vii.

[4] World Bank, *China: Country Economic Memorandum*, p. 135.

[5] PRC Ministry of Foreign Economic Relations and Trade statistics cited in "Mofert Stats Underscore Waning Investor Interest in China", *Business China*, Hong Kong, June 25, 1990 pp. 192–193.

- The establishment of Special Economic Zones in Shenzhen (opposite Hong Kong), Zhuhai (opposite Macao), and Shantou in Guangdong Province, as well as Xiamen in Fujian Province. Although these zones developed slowly at first, the principle of more rapid integration of southern coastal areas into the world economy was established.
- The acceptance of foreign debt, and the beginning of the World Bank program in China.
- The decision in principle to allow foreign companies to participate in natural resource development, offshore oil in particular. Japanese and French government oil companies signed oil development contracts with China in 1980, and major American oil companies followed suit in 1987-1988.
- The first hesitant steps towards decentralization of foreign trade authority, with local governments and enterprises allowed for the first time to retain a portion of their foreign exchange earnings (typically at this time, no more than 20 percent), and with the establishment of the first central and local government competitors to the Mofert foreign trade companies.

1984-1986. Starting from the October 1984 Communist Party Central Committee plenary meeting, the pace of "kaifang" picked up considerably. The plenum passed a document that laid out far more explicitly than ever before the desirability of moving towards important features of a market economy, including a certain proportion of privately owned enterprises.[6]

Shortly afterward, the central government announced that 14 coastal cities would be permitted to offer special incentives to foreign investors. These cities were given large central government grants to develop their infrastructure, and rights to approve small foreign investment projects on their own authority.

Levels of local foreign exchange retention from exports were raised to levels of 30-40 percent for many products and localities. Local trading companies were granted expanded authority to compete directly with Beijing as MOFERT freed up hundreds of commodities from the monopoly of the FTCs. Local governments—particularly in Guangdong—began to borrow large volumes of money from foreign banks directly.

The relocation of export-oriented Hong Kong industry into the Pearl River delta region of Guangdong began in earnest during this period, facilitated not only by China's liberalizing domestic policies, but also by the 1984 agreement between China and Britain calling for Hong Kong to revert to mainland control in 1997. By the end of 1986, Hong Kong firms probably employed more people in Guangdong than they did in Hong Kong itself[7]—primarily in so-called "village and township", i.e., quasi-private, enterprises that had not even existed earlier.

Facilitated considerably by the increased local autonomy and by new detailed joint venture implementing regulations, foreign investment aimed at China's domestic market accelerated as well.

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[6] The plenum communique is reproduced in New China News Ltd , *People's Republic of China Yearbook 1985*, (Hong Kong 1985), pp. 73-86.

[7] Hong Kong Governor David Wilson as reported in Ezra Vogel, *One Step Ahead in China: Guangdong Under Reform*, (Harvard Press, Cambridge, MA) 1989, p. 69.

Large companies such as Otis Elevator, McDermott Babcock and Wilcox, H.J. Heinz, Celanese, American Standard, PPG, Coca Cola, Volkswagen, Peugeot, Philips (Netherlands) and Matsushita all signed joint venture contracts in the 1984–1986 period, a number of them of quite substantial size. Many of these ventures were promised a degree of market access which would have been inconceivable earlier, and many were given foreign exchange convertability guarantees by the Chinese government up front.

1987–1988. The degree of openness peaked as liberal Zhao Ziyang was promoted to the position of Secretary-General of the Communist Party in 1987. Even more forcefully than in 1984, Zhao articulated the concept that coastal China should be linked to the world economy, taking its raw materials from abroad and selling its products on the international market. The export processing economy in Guangdong and, increasingly, Fujian grew ever more rapidly as a result.

In response to perennial foreign investor complaints about the inacessibility of foreign exchange, Zhao's government made the Chinese currency, the renminbi (RMB) partially convertible by setting up over 40 so-called "swap centers" at which domestic currency could exchanged be for foreign exchange controlled by enterprises outside the state plan (including, by definition, almost all enterprises with foreign investment). The price for dollars at these centers was allowed to float by 100 percent or more above the official exchange rate. In 1989, over $8.75 billion was exchanged at the centers.[8]

The swap centers' importance grew as Zhao's government adopted a system of foreign exchange management which greatly increased the percentage of foreign exchange controlled locally outside the plan. Zhao's program allowed local governments and enterprises to retain 80 percent of all foreign exchange earned in excess of 1987 base levels. In the Shenzhen economic zone and other parts of the Pearl River delta, exporters were permitted to keep 100 percent of their foreign exchange earnings.

Local governments in the coastal provinces were permitted in 1988 to approve foreign investment projects valued up to $30 million on their own authority, including wholly foreign-owned manufacturing subsidiaries. Foreign companies desiring a large majority share in Chinese enterprises met far less resistance than they had in earlier years.

For the first time in 1987–1988, foreign companies were given the right to lease land directly in the Special Economic Zones for duration of up to 70 years. Foreign banks obtained their first small operational foothold in the economic zones as well.

II. PROBLEMS IN THE BUSINESS ENVIRONMENT

Despite the ever-increasing openness of the 1980s, few foreign companies perceived China as an easy place to do business. Difficulties arose both from certain deeply ingrained features of the existing bureaucratic command economy that "gaige kaifang" failed to eradicate, and from unintended side-effects of the reforms themselves. Major problems included:

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[8] China Daily Business Supplement, May 7, 1990, p. 1, reported in US Foreign Broadcast Information Service (FBIS), *China Report*, May 1990, p. 16.

SHARP FLUCTUATIONS IN MACROECONOMIC GROWTH RATES AND MONEY SUPPLY

Deng Xiaoping's China followed a pattern of boom and bust cycles whose magnitude and frequency exceeded those in developed capitalist countries. Cycles started with a burst of economic activity fueled by a loose money supply and accompanied by a political push for reform and decentralization. The liberated bureaucracies, both at central and local levels, went on spending binges, particularly for new construction projects, which pushed up the rate of growth but brought inflation and tight material supplies in their wake, leading in turn to feverish speculative purchasing by both individuals and insitutions.

Inflation and speculation inevitably generated, however, a strong backlash from central government planners worried about social and political unrest and the erosion of their own powers. Unable to control the economy through exhortation or purely economic levers such as interest rates—local governments underwriting the booms ignored both—the central government resorted to the familiar administrative controls on spending, which were applied with little selectivity. Indiscriminate austerity inevitably produced strong pressures from below for relaxed controls, starting the cycle all over again.

Most foreign corporate activity in 1980s China closely followed the domestic cycles. Not only did a slowdown in domestic economic activity reduce the demand for foreign products; spasmodic expansion tended to draw down China's foreign exchange reserves, while domestic austerity built them up.

The first major downturn of the Deng Xiaoping era took place in 1981-1982. Sharp cuts in government spending in response to a wave of inflation resulted in the suspension of construction projects across China. The majority of foreign companies doing business in China were forced to delay project negotiations for approximately two years.

The next expansionary phase, a major one, coincided with the reformist push of 1984-1985. It was, however, followed by another contraction at the end of 1985, particularly in foreign exchange expenditures, which had ballooned to unsustainable levels as foreign currency control was decentralized. Imports of consumer goods were curtailed abruptly, and a number of newly-established joint ventures experienced severe foreign currency cash flow problems.

But for most foreign companies in China, this contraction proved to be both milder and of shorter duration than in 1981-1982. One reason was the weakened political position of the old central planners, and the growing powers of the provinces. Another was rapid export growth.

By late 1987 the next economic boom—accompanied by the familiar decentralization and reform push—was in full swing, and imports soared 27.9 percent to a level of $55.2 billion in 1988 .[9] But by the end of 1988, retrenchment had set in once again, a political reaction to the unprecedented inflation that the boom had generated. The central government's cutback on the money supply—the single economic lever over which it still had substantial control—had an even more severe impact on the cash flow of most fledgling foreign investment projects than the 1985 contraction.

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[9] State Statistical Bureau of the PRC, "Statistics for 1988 Socio-Economic Development," Beijing Review, (Beijing), March 6-13, 1989 Supplement, p. vi.

Retrenchment became a full-scale recession after the Tiananmen massacre of June 4, 1989. The economy squeezed by the cutback in foreign lending and tourism, and the downfall of Zhao Ziyang brought the central planning faction back to its most powerful position since 1981, giving an added bite to the latest austerity policies. Economic growth shrank to zero during the first half of 1990, and China's imports dropped by 18 percent compared to the first half of 1989, the most dramatic drop since 1981.[10]

As a result of these fluctuations, many foreign companies whose presence in China was geared to the domestic market failed to meet the goals laid out during boom periods. While some took better precautions than others to cushion themselves against the impact of a downturn, almost all (with the possible exception of disposable consumer goods companies) were to some extent affected by China's macroeconomic gyrations.

BUREAUCRATIC INTERFERENCE

Ten years of reform did not change the fundamentally bureaucratic nature of China's economy. Not only did foreign business people continue to find the pace of bureaucratic decision-making in most parts of China painfully slow, but they also discovered that political priorities or bureaucratic fiat routinely took precedence over law, and even over the terms of signed contracts. Manipulation of political and personal connections was seen as critical to doing business and solving problems, and corruption became an increasingly common phenomenon.

The pervasive, tangled nature of bureaucratic control left foreign companies vulnerable to restrictions, harassment, and uncertainty on such issues as:

Market access. Strict import controls lay at the core of the pre-1979 system, with foreign exchange bureaucratically allocated by the State Planning Commission to the various ministries and provinces. All import transactions required the approval of one of these agencies. As more and more foreign exchange came to be controlled either by provinces or enterprises during the 1980s, the import control system became more porous. But it by no means disapppeared.

Faced, for example, by a flood of consumer durables imports by speculative local government trading companies, the State Council established a new inter-agency office in 1985 to set national import quotas for these goods and parcel the quotas out among the various buyers. The license system reduced imports of these goods to a relative trickle for the next few years.

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[10] General Administration of Customs of the PRC, *China's Customs Statistics (Quarterly)*, (Economic Information & Agency, Hong Kong), 1990.3, p.3.

The import approval procedures for many products gave domestic industry an important voice in the process. The Ministry of Chemicals Industry, for example, has sat on an inter-agency consultative committee determining pesticide and herbicide import levels.[11]

The license system restricted not only foreign exporters to China, but also foreign manufacturers in China. Chrysler and Xerox, for example, were forced to operate their respective jeep and photocopier plants in China at a fraction of capacity due to failure to obtain import licenses for an adequate volume of critical parts.

Even when import licenses were not required, some American manufacturers were denied market access in China. The Chinese partner of one American joint venture manufacturing a name-brand consumer product in Shanghai, for example, was ordered by the State Planning Commission to curtail the joint venture's production in late 1988. There were strong suggestions that the action was instigated by the Ministry of Light Industry on behalf of disgruntled domestic manufacturers of the product, and the issue was not resolved until the American company agreed to export much of the additional production.

Another American company making an almost identical product in a Guangzhou joint venture was given the same order by the central agency. Ultimately, however, local authorities ignored it in the interests of keeping the plant running to full capacity, illustrating the increasing divergence between the business climate in North and South China.

Personnel. At the enterprise level, control over personnel was the core of the bureaucracy's power. It is hardly surprising, therefore, that the bureaucracy strongly resisted foreign influence on personnel issues.

Despite regulations to the contrary, Chinese personnel wishing to transfer from state-owned enterprises to joint ventures were often blocked by their old employers (who controlled their all-important personal files and residence cards) from switching. In the same vein, many Chinese joint-venture managers who became too close to foreign partners were abruptly transferred by Chinese partners.

The bureaucratic obsession with control affected wage policies as well. Ironically, on more than one occasion, Chinese joint venture partners or government labor bureaus blocked foreign managers from raising wages to reward productivity, for fear of creating too great a differential between joint venture and domestic enterprise wages.

Taxes and Fees. The extraordinarily wide latitude enjoyed by a host of bureaucratic organs to levy taxes and fees—or exempt foreign companies from them—led to arbitrariness and abuse. One of many examples was the decision in 1989 to revoke the exemption of foreign joint venture feed companies from the Consolidated Industrial and Commercial Tax (CICT, a kind of sales tax) while maintaining the exemption for wholly domestically owned enterprises.

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[11] Mofert announcement of 1986 cited in American Chamber of Commerce in Hong Kong, "Import Controls in China", *China Business Review*, (National Council for US-China Trade, Washington DC), Jan-Feb 1987, p. 43.

Shift of Bureaucratic Responsibility. Partial reform in the 1980s added to the problem of bureaucracy by blurring the lines of bureaucratic authority. Foreign companies experienced great difficulties determining whether the authority claimed by their negotiating counterparts was real, and if real, how long it would last. Authority either shifted unpredictably back and forth among central and local government, or became fragmented among the various central and local government organs.

Ambiguous lines of bureaucratic authority created particular problems for some foreign banks. In one notable case in 1989–1990, the First National Bank of Chicago attempted to call a guarantee that had been issued by the "Guangdong branch" of a major central government trading company. At the time the loan was made, the Guangdong branch was technically owned by the Beijing head office, but by the time the loan was called, what had been the Guangdong branch was an independent company owned by the Guangdong provincial government. For more than a year and a half, neither Guangdong nor the central government would claim responsibility for the guarantee.[12] Again, the legal system proved unable to even begin to establish systematic principles of responsibility.

A Two-tiered Economy. If bureaucratic interference and macroeconomic fluctuations reflected the persistence of the old command system, the so-called "two-tiered" economy", i.e. the emergence of a quasi-market economy parallel to the command economy, reflected the contradictions of a partially reformed system. Although many foreign companies would not have been able to operate in China at all without the second tier, the tiered system created certain competitive disadvantages for them.

The two-tiered economy was based on the price differentials for materials distributed under the state plan at subsidized prices and those distributed outside the state plan at market prices. These differentials were as great as 300–400 percent in the late 1980s for key industrial raw materials in short supply, such as coal, metals, plastics, etc.

Almost all foreign joint ventures in China, by definition, operated outside the state plan for materials distribution. Their material costs were substantially higher than their competitors within the state plan.

The formation of foreign currency swap centers created a similar two-tiered system for foreign currency, and foreign companies were squeezed on this front as well. When investing their dollars in China, they were required to exchange them for RMB at low official rates. But when converting RMB to repatriate from China, they were forced to convert at the premium swap center rates.

The two-tiered currency system and resulting foreign exchange arbitrage also wreaked havoc on many of the traditional Chinese exporting foreign trade companies (FTCs) and their American customers. The FTCs were required by the central government to trade foreign currency for RMB at official exchange rates. Newly established trading companies in Guangdong, whose swap centers were the most lively in the country due to the abundance of locally retained foreign exchange, could acquire swap center RMB more cheaply, enabling them to pay a higher RMB procurement price to Chinese export good manufacturers and still sell abroad at a foreign currency price equal to or lower than their FTC competitors.

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[12] Details of court proceedings on this case are reproduced in "Cases", *China Law and Practice*, (China Law and Practice Ltd., Hong Kong), February 26, 1990.

Lack of Respect for Intellectual Property. The successive publication of trademark, patent, and copyright laws in the reform era marked an important advance in China's recognition of the legitimacy of intellectual property protection. But in practice, there continued to be many violations of intellectual property that disadvantaged foreign companies.

Reports of Chinese attempts to duplicate patented technology without authorization were legion. Indeed, many companies took for granted that such attempts would be made, and that some of their technical trainees came from potential Chinese competitors.

In certain respects, the problems Americans encountered in China were similar to those they encountered in other parts of Asia in the 1970s and 1980s. Unauthorized Chinese infringement of trademarks and copyrights, for example, echoed the experience of many companies in Taiwan and Thailand. Significantly, violations of American company trademarks, particularly for consumer products, took place primarily in the open, freewheeling Southern coastal provinces, the part of China most similar to other developing Asian economies.

But Chinese disregard for intellectual property rights was not always an insurmountable problem. As time passed, China proved increasingly skillful at negotiating legal, legitimate technology transfer in connection with large import projects, although some firms, mindful of Japan's rapid technological advance in the 1960s and 1970s, held back some of their best technology, or insisted on an equity share in any Chinese enterprise using their technology. Some companies succeeded in curtailing local government abuse of their trademarks through appeals to the legal system. Finally, many considered the risk of intellectual property violations worth bearing in order to enter the China market.

"Middle Kingdom Complex". Perhaps the most elusive problem in China's business climate to describe, but one of the most deeply felt by American business people in the 1980s was the cavalier attitude towards their interests of many of their Chinese counterparts. Many sensed a Chinese attitude of superiority or even condescension, a conviction that China was such an important market that the American companies would do anything to enter it, and a willingness to take any action to gain advantage. These tendencies appeared all the more galling in the context of incessant Chinese rhetoric about "mutual benefit" in commercial transactions.

The manifestations of what some foreigners called "the middle kingdom complex" included, for instance, arbitrary violations of contracts under the assumption that the foreign companies needed China more than China needed them. One petroleum equipment supplier, for example, was notified in 1987 that only a 65 percent payment would be made for equipment just shipped, not the 90 percent that the contract and the letter of credit called for. Another characteristic is a tendency to make the resolution of Chinese internal difficulties the responsibility of the foreign party. Numerous

Chinese exporting agencies, for example, simply refused to carry out export commitments to American firms when the domestic Chinese procurement price for the goods in question jumped unexpectedly between the time of contract signing and planned shipment.

Another new tendency is to treat the foreign party to joint ventures more as a resource to be exploited than as a partner. It became a custom, for example, for the Chinese partner to demand salaries for their joint venture managerial personnel commensurate with that of the foreign managers, even though the Chinese managers themselves were not allowed to keep more than a small amount of the money, the rest going to the partner. More significant was the frequent Chinese pressure on foreign partners to make large up-front investments in plant and equipment, regardless of the market prospects for the product.

A final example is the reluctance, or, in some cases, absolute unwillingness of the Chinese authorities to allow foreigners to compete in such services as engineering and design, telecommunications, insurance, transportation and, outside the economic zones, domestic banking.

Some portion of the foreign complaints about Chinese attitudes can be attributed to a lack of cross-cultural understanding, particularly regarding the sanctity of contracts as opposed to personal relationships. Certainly some complaints derive simply from Chinese negotiating skill, and understandable exploitation of China's advantage as the world's largest potential market. Moreover, the behavior of many foreign companies did nothing to disabuse Chinese negotiators of the notion that they would do almost anything to enter the China market.

Many foreign company executives, furthermore, brought their own attitudes of cultural superiority and selfishness to the negotiating table. And there were certainly foreign companies guilty of bad-faith violations of contracts with China. Even when these factors are considered, however, the "middle kingdom complex" still emerged as a salient feature of the China business environment, particularly in the state-run part of China's economy, and an obstacle to the expansion of China's international commerce.

III. Business Environment Prior to June 4, 1989

For corporations, evaluation of a business climate ultimately boils down to whether they are making money, or gaining a market position that will enable them to make money in the future. Judging by this standard, China's business climate in the 1980s presented a very mixed picture.

Many commodities suppliers considered the China business climate favorable simply because of large sales volumes. Most did some business with China prior to the Deng Xiaoping era, but reform, by creating rapid economic growth, greatly increased China's importance to them. Suppliers of wheat, steel, fertilizer, timber, and plastic resins, for all of which China experienced chronic shortages, were outstanding examples of this type of company. World price trends had a much bigger impact on the profitability of these companies' China business than China-specific factors, and China's large purchases themselves tended to support prices.

China was also an important market for certain capital goods of high priority to the Beijing government, such as petroleum, railroad, aviation, telecommunications, power plant, and mining equipment, as well as process control instruments. To be sure, intense international competition eroded the profitability of much of this business. But during the American petroleum industry recession of the mid-1980s, China business kept afloat certain companies, such as the petroleum drill bit manufacturer Hughes Tool (now Baker Hughes).

As China's standard of living increased, it also became a good, though inconsistent, market for consumer electronics such as televisions and refrigerators. Even after the Chinese government clamped down on imports of the finished products, suppliers of components (mostly non-American) for assembly in China continued to do strong business.

Other companies, in contrast, benefitted as much from liberalization of Chinese policies as from growth per se, most notably American retailers of labor-intensive consumer goods such as toys, shoes, apparel, handbags, and even electronic goods. The opening of the southern coastal provinces to foreign investment made China a profitable, indeed critical overseas production platform for makers of these and related items.

Liberalization was also the key to success for a number of American consumer products giants such as Coca Cola and Pepsi Cola, Proctor & Gamble, H.J. Heinz, S. C. Johnson (Johnson Wax), and Squibb, who desired primarily to sell to the Chinese domestic market. For all the bureaucratic obstacles to market access that these manufacturers faced, their ability to establish a manufacturing and sales presence in China—and the consequent steady growth in their market volume—more than made up for the frustrations and even for the low initial profitability.

For a large number, perhaps the majority, of American producer goods firms wishing to penetrate the China market, however, the verdict on the 1980s was more ambiguous. China became a market for some of them, such as the chemical and electronic giants, but hardly a critical one, and often not a terribly profitable one due to the intensity of the competition and the high costs of doing business.

Many such companies established manufacturing operations in China in the second half of the 1980s, and many more were considering doing so at the time of the June 4 massacre. Measured purely in terms of profitability, these joint ventures or wholly owned subsidiaries did not necessarily do badly. Indeed, a survey of 50 of them by the US-China Business Council in early 1989 showed that about half were profitable, at least in local currency.[13] However, the time, effort, and money they spent combatting the various obstacles presented by China's business environment could only be justified by increasing volumes resulting from economic liberalization and growth. Many, if not most, had not achieved the volumes by 1989 that would completely justify their existence.

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[13] U.S.-China Business Council, *U.S. Investment in China*, Washington DC, 1990, p. 83.

For these companies and others that were just entering the market in the late 1980s, China's attraction was not so much its current business climate as the perception that the climate had improved over time and would continue to improve in the future. Although some companies had reached the tentative conclusion by 1989 that the "long term" in China was never going to materialize, optimisim about the future was probably the single most important reason for the generally high level of American corporate interest in China throughout the 1980s.

IV. Business Post-Tiananmen

THE DOWNTURN

Confidence in the future has been the main casualty of the killings on June 4, 1989. The political paralysis in April–May 1989, and the turbulence and repression since June 4 have reinforced for western business people just how critical the connection is between politics and economics in China. Most have serious concerns about a political system run by octogenarians with no viable transition mechanism and a disaffected population.

The severe economic recession during the year following June 4 has contributed to business uncertainty about the future. While many corporate China veterans view the recession as just another, albeit an amplified version of the down phase in the China business cycle, the coincidence of political instability with an economic downturn have led many to conclude that a real turnaround in the Chinese economy awaits a transition to a post-Deng leadership. Most still claim to believe in China's long-run growth potential, but their assessment of the next 5–10 years is decidedly more pessimistic than pre-Tiananmen.

Western and Japanese investment in China has fallen off sharply in the year following Tiananmen, a direct reflection of declining confidence in the business environment. According to (probably understated) official Chinese statistics, new foreign investment commitments for the year following Tiananmen trailed commitments for the preceeding year by 21 percent.[14]

Investment statistics do not capture the extent to which June 4 has discouraged companies new to the market, particularly small and medium-sized ones, from initiating projects. The pressures to be in China for prestige reasons have evaporated.

Companies already committed to the market have been affected by a Tiananmen-induced reduction in foreign exchange availability. The U.S. government-led cutback in World Bank lending—which totalled $500 million in new loans June 1989–1990 compared to a pre-Tiananmen projection of $1.5–2 billion—combined with the decline in tourism and the reluctance of many other government and commercial banks to lend when the World Bank was pulling back, was a major factor behind the steep drop in Chinese imports during the 1989–1990 recession.

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[14] PRC Ministry of Foreign Economic Relations and Trade statistics cited in Xinhua News Agency release of July 23, *FBIS*, July 25 , 1990, p. 36.

Declining foreign exchange cash flow has furthermore created repayments problems for many Chinese foreign exchange borrowers, particularly in the hotel/service sectors catering to foreigners who are no longer flocking to China in such large numbers. Borrowers for Chinese real estate projects have been forced to reschedule billions of dollars of debt (primarily from Japanese banks), and some smaller borrowers have defaulted.

China is thus in a much less favorable position to drive hard bargains with foreign companies and banks. Many foreign governments have curtailed thier concessionary lending to China, and the interest spread on commercial loans to China has risen from less than one-half a percentage point above LIBOR pre-Tiananmen to close to one point above LIBOR. Rising Western government and corporate interest in East Europe following that region's startling transformation increases China's difficulties in attracting cheap funds (particularly German), and the 1990 Middle East crisis may do so as well.

The political tightening of 1989–1990 has also had an impact, particularly for some companies already operating joint ventures in China. Bureaucracies threatened by foreign investment feel more emboldened to interfere in joint venture operations. For example, the U.S.-China Business Council has received numerous reports from member companies of bureaucratic limitations on wages not just for managers, but for workers.

The political repression has taken a particularly strong toll on progressive Chinese managers, who place themselves in danger of political criticism if they take bold reform initiatives. Many students and technicians trained abroad who might serve in China's new managerial class are simply not returning home.

THE SILVER LINING

There have been important exceptions to the pattern of deterioration of China's post-Tiananmen business environment, most notably in southern coastal China. Although the South was not exempted from the cutback in domestic credit for the year following Tiananmen, the export processing economy which has made the region so rich has remained largely intact. Beijing appears to have carried out few, if any, of its early threats to recentralize control of southern foreign exchange, and to do away with the township and village enterprises that have played so important a role in the Southern export drive. The operations of the export processing factories have not been affected by politics.

Indeed, the chief threat to the southern exporting economy has come from the United States in the form of Congressional pressure to abolish China's non-discriminatory tariff treatment, or most favored nation status (MFN), as a signal of disapproval of the Chinese leadership. Without MFN, the tariffs on consumer products shipped from South China to US retailers would rise from an average of about 5–10 percent of value to a level of 50 percent or greater, effectively driving them from the market.[15] As the USA is by far the most important market for these goods, the withdrawal of MFN would thus gut the South China export economy.

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[15] U.S. Customs Bureau statistics cited in "Letter from the President", *China Business Review*, U.S.-China Business Council, May–June 1990, p. 7.

Although the Bush Administration appears in late 1990 to have contained the congressional pressure on MFN, the public debate on the subject, combined with the shock of June 4 has led some manufacturers of products such as toys, particularly from Hong Kong, to divert investment away from China to other developing countries to ensure against disruption that might result from removal of MFN or another round of upheaval in China. This diversification is not effecting production in the short run, but might slow the rate of export growth from South China in future years, and will certainly result in a major drop-off in purchases from China in the event of future trouble there.

If American and Hong Kong companies are trying to develop sources other than China, however, Taiwan is moving full force into China despite Tiananmen. Prompted by appreciating Taiwanese currency, rising wage rates, Fujian's proximity and its cultural similarity to Taiwan, Taiwan investors are starting to do in Fujian what Hong Kong investors did in Guangdong in the second half of the 1980s. Unlike Hong Kong, for which Tiananmen was a profound shock, Taiwan, which does not face reabsorption into the mainland political system in 1997, has been able to separate political factors from its evaluation of the China business climate.

Chinese government statistics show that Taiwan companies have committed $1.5 billion dollars of direct investment to China from the beginning of 1988 through the first quarter of 1990.[16] Taiwan shoe manufacturers have moved production lines en masse to Fujian, and manufacturers of other products such as sporting equipment have indicated they might follow. Some of Taiwan's largest companies, including Formosa Plastics Group, are seriously discussing the formation of manufacturing enterprises on the mainland.

In addition to southern export processing, certain other sectors of the Chinese economy appear to have been spared the fallout of Tiananmen, including the petroleum and civil aviation industries. Significantly, both have a substantial foreign exchange income stream (which, in petroleum's case, will likely be increased by the Mideast crisis). Chinese civil aviation and offshore petroleum companies continue to enjoy favorable credit ratings abroad, as does the China International Trust and Investment Corporation (CITIC), a state-run but entrepreneurally-minded merchant bank which easily raised $1 billion in 1990 to buy a share of Hong Kong's telephone company.

TOWARDS THE FUTURE

By the second half of 1990, some foreign companies are starting to see signs of a general improvement in China's business environment. The tight domestic credit policy appears to be easing somewhat, in response to the leadership's alarm about the economic recession. The recentralization rhetoric has subsided and China's inquiries for foreign goods are on the increase. Certain companies, such as Amoco Chemical in Jiangsu Province and Westinghouse in Shenzhen, have put the finishing touches on investment plans which had been suspended after the massacre. And the post-Tiananmen international stigma of doing business in China is easing, judging by the resumed flow of high corporate executives to China.

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[16] Ministry of Foreign Economic Relations and Trade statistics cited in *China Market Intelligence*, US-China Business Council, June 1990, p. 5.

But a rebound from the floor of the second half of 1989 and first-half 1990 by no means signifies a return to the status quo pre-Tiananmen. There remains a powerful sense among foreign business people, as well as Chinese, that there can be no fundamental resolution of the major question marks regarding China's business climate until the political transition from Deng Xiaoping to a new leadership has been completed.

Many of the problems endemic to China's business climate, such as bureaucratic interference in operations, do not appear susceptible to an immediate solution even with political change. But the history of the 1980s suggests that foreign businesspeople perceive that the situation is improving, and that they are willing to bear with considerable difficulties in the China market given its size and potential.

The experience of the reform decade also suggests that there may be increasing divergence in the future between the economic and business climate in southern coastal China that is an integral part of the world economy, and in a northern China that to some extent benefits from the prosperity of South China, but remains a significantly more closed economy and a less inviting place for foreign companies to do business. As in the 1980s, this difference will create both opportunities and complications for foreign companies in China.

CHINA'S POTENTIAL FOR EXPORT-LED GROWTH

By William A. Fischer [*]

CONTENTS

Page
I. Traditional Export-Led Growth 786
II. Changes in the Export and Offshore Sourcing Environment 789
III. China and the Issues Potentially Constraining Continued Export-Led Growth 790
A. China's Comparative Advantage 790
B. China's Manufacturing Base 791
C. China's Managerial Resources 792
IV. Conclusions 793

The success and vitality of China's economic reforms during the early and mid- 1980s generated considerable, even exuberant, optimism among students of economic development. The sheer size of the Chinese market, a sustained period of domestic tranquility, and the strong commitment of the Chinese government toward modernization, growth, and greater involvement in the world economic community, created a buoyant feeling that China was poised for success. Many Western observers began to speak of the inevitability of China joining several of its East Asian neighbors as a newly industrializing country (NIC);[1] a country that was able to overcome the debilitating poverty of underdevelopment and enjoy sufficiently rapid economic growth to allow it to break away from the rest of the "third world." Some authors even saw China approximating, in many dimensions, an *East Asian development model*; a model used to explain the unusual economic success enjoyed by several NICs within the region.

Central to the many explanations that such models offer in an effort to describe the region's growth has been the recognition of export-led growth [2] and relatively open economies as mechanisms for both increasing the availability of foreign exchange (and, hence, foreign technology and management skills) in such societies, and strengthening domestic industrial capabilities through international competitive testing. In China's case, despite strong domestic market protection, the total value of trade, sustained investment, and joint ventures experienced during the 1980s, appeared to be evidence that the nation was well on the way to emulating the success demonstrated by Hong Kong, Singapore, South Korea, Taiwan, and even Japan, despite significant limitations in the capabilities of the Chinese economic system for supporting such growth. It is argued in this paper, however, that such optimism may well have been premature. Significant systemic and infrastructural deficiencies existed throughout China's economic system which, without substantial attention and reform, meant that continued economic growth could not be taken for granted. In addition, the recent retrenchment of key portions of the economic reform program, a significant reduction in managerial autonomy, and a widespread diminution in the attractiveness of China to many potential foreign investors have all further reduced the prospects for exports as an engine of immediate and sustained economic growth.

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[1] For example, Dwight H. Perkins, *China: Asia's Next Economic Giant?* (Seattle, University of Washington Press, 1986).

[2] Peter L. Berger, "An East Asian Development Model?" in Peter L. Berger and Hsin-Huang Michael Hsiao (eds.), *In Search of An East Asian Development Model* (New Brunswick, NJ, Transaction Books, 1988), p. 5; and John B. Sheehan, *Alternative International Economic Strategies and Their Relevance for China*, World Bank Staff Working Paper No. 759, (Washington, D.C., the World Bank, 1986).

I. TRADITIONAL EXPORT-LED GROWTH

In almost every case, a significant portion of the initial post-war success of Japan and the East-Asian NICs began with the utilization of low-wage labor to enter world markets.[3] Traditionally nations with abundant labor, working at relatively low wages, have chosen to enter international trade by concentrating on the low-cost production of standardized items in mature markets. Typically such market entrants specialize in bottom-of-the-line, low-fashion-content, items, relying heavily on labor-intensive flow-shop assembly operations, where a high division of labor allows for the capturing of learning economies without the requirement of well-trained or highly participatory labor forces. This, apparently, was what the former secretary-general of the Chinese Communist Party, Zhou Ziyang, had in mind in January 1988, when he spoke of his plans for the development of China's coastal regions:

> Today, our coastal economy has been furnished with an excellent opportunity for development. With the ongoing changes in wage structures around the world, the industrialized nations are reorganizing their industrial structures and shifting labor-intensive production operations to areas offering inexpensive labor. China's coastal regions have great potential for benefiting from this movement. They are capable of providing inexpensive labor, a relatively qualified work force, easy access to transportation, and a good infrastructure, coupled with scientific and technological development capabilities. This is all it takes, and if we simply do our work well, we will be able to attract a great deal of foreign investment.[4]

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[3] In the case of Japan, her postwar exports to the developed world were based on labor-intensive advantages, while her exports to developing countries were based on heavy, capital-intensive products. (G.C. Allen, *The Japanese Economy* (New York, St. Martin's Press, 1981), pp. 162–163.

[4] Zhao Ziyang, Renmin Ribao, January 23, 1988, as quoted in Toshio Watanabe, "Bringing China Out of Its Shell: The Asian NIEs," *JETRO China Newsletter*, No. 87, July–August 1990, p. 2.

The idea is an attractive one. A focus on low-variety, no-fashion, mature products requires little from the manufacturer other than acceptable (but not necessarily *better than acceptable*) quality—an important consideration for those products produced under labor-intensive conditions, where relatively high-quality variances are the norm. Design (to the extent that there is any of significance), distribution, and marketing tend to be the province of buyers from the developed world, who typically then market the products under their own labels, within their own distribution systems. The maturity of the product, and the lack of fashion, ensure that there will be few, if any, surprises in terms of market demand irregularities and, consequently, little if any responsiveness is needed by the factory in the developing country. This is further reinforced to the extent that the production process can be segmented, thus allowing the decoupling of the activities performed in the developing country from vertically dependent preceding and succeeding activities. This reduces the need for integration or infrastructure development on the part of the foreign buyer, and reduces the risk of production disruption due to faulty or inadequate interorganizational linkages.

The logic inherent in the choice of such traditional export-led growth is obvious. The comparative advantage of the developing countries is thought to be their low-wage labor, which is typically unskilled. By employing such labor in a manner that allows it to compete on the basis of price (not quality, responsiveness, or fashion—which essentially means concentrating on the production of standardized, mature products), the developing nation seeks to avoid competition based on technical skills, fashion mastery, geographic proximity, market knowledge, or customer interaction. Such products require little in terms of global integration of a supplier-distributor network and little in terms of organizational agility in responding to national market differences. Instead, they rely on the brute power of the economies of scale inherent in high-volume, low-variety, mass production. Firms in developing countries engaged in this type of trade are selling price, and little else. They qualify to participate in international trade, despite often unsatisfactory quality and unreliable delivery performance, because they are so cheap, and they win orders solely on the basis of this criterion.[5]

In China's case, with a manufacturing base that is characterized by vintage equipment, low labor productivity, unreliable quality, poorly developed supplier-customer relations, information scarcity, excess inventory, obsolete product design, and almost no manufacturing flexibility or responsiveness, a reliance on providing straight forward subcontracting of labor intensive operations makes for a rational approach to entering international commerce. In fact, such a strategy has already had some geographically limited, but nonetheless considerable, success in China, particularly in the coastal regions of Guangdong province. There, close commercial and family ties with Hong Kong producers have resulted in estimates of from 850,000 to 1.7 million Chinese workers employed (in 1988) in foreign-related manufacturing operations.[6] Similar, but less-developed relationships are emerging among Fujian and Zhejiang and Taiwan, and between the provinces of northeast China and Korea. Yet, despite all this, the long-range prospects for development throughout China are not nearly as optimistic as that experienced along the coast, and it is still not entirely clear that the current export emphasis along the coast will yield the types of results—improved technology and managerial skills—that China needs for the future growth of her own indigenous industrial capabilities.

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[5] For a discussion of the importance of *order winners and qualifiers* to manufacturing strategy, see: Terry Hill, *Manufacturing Strategy*, (Homewood, IL, Richard D. Irwin, Inc., 1989).

Alternatives to such traditional low-wage labor-fueled growth, however, are quite difficult for a firm from a developing country, such as China, to master by itself without some form of ongoing relationship with a foreign partner. To compete in international trade without relying on low-wage labor as the key factor of comparative advantage requires the development of some form of market niche that insulates the developing country firm from the competitive strengths (e.g., automated manufacturing, state-of-the-art product design and technology, superior advertising and/or distributional advantages, etc.) of their counterparts from developed countries who are, in this case, defending their home markets. Niche strategies, unlike strategies based solely upon mass-production economies of scale, emphasize some form of particular responsiveness to customer needs, usually either through product design or development or else through a willingness to serve the customer promptly with short production runs, quick delivery, or service. In manufacturing strategy terms, this implies operating in some form of job-shop format and likely maintaining some form of close liaison with the customer (either geographical or informational).

Niche strategies are particularly difficult for the developing country (and especially Chinese) enterprise because they typically require an especially sensitive understanding of the foreign market being served so as to be not only responsive to changing customer desires, but also to be able to anticipate them. This is necessary in those cases where the security of the niche is based primarily upon the niche-holder's ability to "lead" among the market leaders. Such market responsiveness also requires high flexibility in the enterprise's manufacturing process, in order to quickly "gear up" for the production of new or altered products, and high levels of support from the firm's vendors, who must also be able to respond quickly. Needless to say, the quality of such products must be high (to justify the premium that is associated with such strategies), and access to and dependability of distribution systems must also be guaranteed. The difficulties inherent in niche strategies usually suggest that developing countries cannot reliably count on them as export-led growth paths in many industries. Such strategies are effective only if these countries enter into some form of alliance or network with foreign partners, who because of advantages of location, birth, resources, or experience, can navigate the difficulties noted above. In other words, the independent (or even relatively independent) pursuit of niche markets is not likely to be particularly rewarding.

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[6] Watanabe, ibid.

II. CHANGES IN THE EXPORT AND OFFSHORE SOURCING ENVIRONMENT

In many of its most important export markets, and particularly in textiles and apparel, China has followed traditional growth paths and concentrated on mass-produced goods. Despite some considerable short-term success in establishing strong export performance of such products, there is real reason for concern over the long-range viability and contribution of such trade. While appearing to follow the experiences of other East Asian NICs in the successful export of low-wage products, there are some significant differences that must be recognized.

First, the world has changed substantially since Japan and the East Asian NICs utilized such price competitiveness to build their growth. The markets of the rich countries in North America and Western Europe, which once welcomed imports from the developing world, are nowhere near as hospitable as they were 20 years ago. Today, rather than struggling to satisfy expanding growth, and hence not being bothered by imports serving the demand that could not otherwise be satisfied, many mature industries in these economies are threatened by low-wage imports and see themselves as being involved in a zero-sum game. Their response, frequently, is to petition for some form of trade barriers in order to resist continued market loss. China, in particular, has been a frequent target for such protectionist action.

Second, the simplicity of the products being produced by the low-wage competitors, and the large volumes involved, have also made such products particularly attractive candidates for automation. This has reached the point in the developed world where in many industries labor as a percentage of cost of goods sold has been reduced to around 10 percent. At such levels, *cheap labor ceases to* be *an effective comparative advantage* for *entering the most cosmopolitan markets*. It no longer makes sense to produce or assemble overseas, particularly at sites where there are difficulties involved with either operations or living; the economics of cheap labor are no longer as compelling as they once were!

Third, political changes in the world economy have led developing countries to be dissatisfied with commercial relationships that are entirely exploitative. The goal of many, if not most, of these nations today is to acquire enough foreign technology and managerial skills to be able to enter into world markets with some degree of self-assurance and independence. Yet such desires have forced these countries to seriously reexamine the nature of what it is they have to offer in exchange for the technology and skills they need. And this, in turn, often means a reconsideration of the nature of the linkages that exist between their domestic economies and the world market. Traditionally the developing country has offered its low-wage labor resources in such instances in the form of basically selling contract labor and manufacturing capacity to foreign firms that wish to cut costs. These relationships are frequently characterized by foot-loose foreign customers who have no interest in anything by contracting for cheap labor resources. Often there is absolutely no opportunity in the relationship or the production process for learning to take place, or for any sort of skill formation to result from the work performed. In other words, such arrangements do not lead to durable relationships, "partnerships," sharing of technology (actually, the foreign firms in such relationships are only in the developing country for those operations that they have deemed not susceptible to automation, or as a way of forestalling their own need to invest in automation) or management skills, or anything that represents commitment. They are clearly not the *engines of growth* that will rescue the developing economy from its plight.

Increasingly, the developing country must have something more to offer the potential foreign supplier of advanced technology or management skills than merely cheap labor, if the country is to hope for a successful transfer of technology. Principally, it needs some guarantee of intimacy and durability in the transfer relationship. Intimacy is needed to maximize the scope of technologies transferred and to ensure the attention and customization needed in order to guarantee the suitability of what is transferred. Durability is required to guarantee timely responses on the part of the technology supplier to changes in the recipient firm's operating environment, as well as to ensure an ongoing relationship over time so that the transferred technology maintains its currentness. Intimacy and durability, as their biological metaphor suggests, require preparation, commitment, trust, sharing, and occasionally sacrifice on the part of *both* partners. In addition, partners have to believe that they will be enriched by the partnership. For this to happen in an economic context, a number of issues have to be resolved. In China's case, many of these issues are quite formidable.

III. China and the Issues Potentially Constraining Continued Export-Led Growth

China appears to have three major areas that need to be addressed in an effort to establish a solid foundation for future export-led growth. These are its comparative advantage, its manufacturing base, and its managerial resources.

A. CHINA'S COMPARATIVE ADVANTAGE

China's primary comparative advantage is her large domestic market. As has been argued earlier, cheap labor no longer has the attractiveness nor the inducements (for intimate and durable relationships) that would make China an unusually attractive location for foreign economic activity. What China has that no one else has, is the world's potentially largest commercial market. There are, however, a number of significant problems associated with her being able to leverage this market to its full advantage.[7]

Despite its size, China's domestic market is not actually one large market. It is not a nationally integrated market. Rather, it is a market fragmented by infrastructure deficiencies, provincial and regional jealousies, and the immaturity of China's domestic commercial media. Each of these serves to truncate the achievement of economies of scale by Chinese enterprises and to frustrate the plans of potential foreign investors. Chinese industry, as a result, has not been as strong as it might be,[8] nor have foreign firms been willing to make the sorts of contributions that they might have otherwise been able to make. Without a national market, it has not been possible for China to develop the specialized intermediate producers, or subcontractors, that have been so important for efficient, innovative, and high-quality production in modern economies.[9] To achieve maximum attractiveness, and effectiveness, the domestic market in China must be integrated in a fashion that makes it truly a national market.

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[7] William A. Fischer, "China and the Opportunities for Economic Development through Technology Transfer," in Mary Ann Von Glinow (ed.), *The Dialectics of Technology Transfer* (New York, Oxford University Press, forthcoming).

To ensure durable and intimate relations with foreign suppliers of technology and managerial skills, the Chinese domestic market must not only be encouraged to pursue export-led growth but it must also be opened to foreign commercial presences. Without intimate and durable economic relations with cosmopolitan foreign partners, China will be consigned to lag behind the rest of the world in technology, management, and the production and distribution of successful, high-value-added exports. It will only be through such relationships that China will be able to attract the knowledge and capital that it needs so badly. However, the only attraction that China holds for such firms is the promise of selling in the domestic Chinese market, in a relatively unfettered manner, and repatriating the resulting profits. This, in turn, means that Chinese industry must be prepared for international competition, something that is quite far removed from the present situation, and that issues such as product design, vendor selection, process technology choice and investment, manpower skills and workload planning, and the like, that have traditionally been the province of bureaus within the industrial structure, must be divested to the discretion of enterprise managers and their foreign associates, in order to assure the manufacturing and technical responsiveness and organizational agility that will be needed to participate in the global market place.

B. CHINA'S MANUFACTURING BASE [10]

The very ability to satisfy most of the day-to-day needs of one-quarter of the world's population in a dependable and reasonably cost-efficient manner makes China a great manufacturing power. Nonetheless, China is far from being well prepared to compete in the global market. Specifically, China's manufacturing base is, in general, quite old and lacking in the quality, efficiency, flexibility, and reliability advantages that are embodied in the newer manufacturing technologies that are increasingly being used in both the developed and developing worlds. A portion of China's industrial productivity problems, both in terms of labor output and in terms of energy efficiency, are related to her aged equipment. Chinese product design skills also are inadequately developed to serve a number of sophisticated, cosmopolitan markets. A major reason for this is the years of estrangement from the world economic and design communities that she suffered. However, the imbalance of demand relative to supply and the persistence of protectionism within the domestic economy have kept many Chinese enterprises from recognizing the role that product design plays as a competitive weapon.

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[8] James C. Abegglen and George Stalk, Jr., provide solid support for the benefits of strengthening domestic industry as a prelude for international competition in *Kaisha*, (Tokyo, Charles E. Tuttle Co., 1981).

[9] Jorge M. Katz, "Technology and Economic Development: An Overview of Research Findings," in Moshe Syrquin and Simon Teitel, (eds.), *Trade, Stability, Technology, and Equity in Latin America* (New York, Academic Press, 1982).

[10] William A. Fischer, "China's Manufacturing Capabilities," Working Paper, Summer 1990.

Despite some very obvious successes in improving her manufacturing capabilities, serious deficiencies in some of the more traditional manufacturing areas continue to plague Chinese competitive performance. Quality control, for example, remains a problem despite years of attention from government agencies. Here, problems in sourcing, materials availability, worker and managerial motivation, equipment vintage, distribution, and worker preparation all conspire against dependability in quality manufacturing. Shop floor control and manufacturing information systems also remain relatively underdeveloped within the Chinese economy. Although there are many reasons for this, the problem is more than simply the lack of Management Information System (MIS) hardware. Scarcity of useful information, problems with the operational integrity of the information that is available, no tradition of managerial information, and a work force that is under-informed and not empowered to act on the information that is distributed to them, all limit the flexibility of the Chinese industrial enterprise. One of the results of informational deficiencies is the vast quantities of inventory that are present throughout the Chinese economy. This inventory not only ties up enterprise working capital (and, hence, much of their organizational agility), but it also represents a gross misallocation of resources throughout the economy.

C. CHINA'S MANAGERIAL RESOURCES [11]

Central to the problems facing China's prospects for growing interaction with the global business environment and her ability to sustain and develop export-led growth is the capabilities of her managerial resources. There should be no doubt that China has a sizable cadre of excellent managers. Their performance over the 30 years preceding the economic reforms, and their astonishing successes over the past decade under these reforms, has provided ample witness to the capabilities of Chinese managers. The system that they have worked within, however, has proved to be a considerable burden, and much of their success has been made *despite* the system, rather than because of it.

From a micro-economic perspective, the key policies associated with economic reform have been the decentralization of managerial discretion and the increased autonomy for decision-making. In those situations where decentralization and autonomy have been allowed to occur in a relatively unfettered fashion, the Chinese manager has evolved into capable and competent decision-maker. A particularly vivid illustration of this is the impressive growth of managerial awareness, sophistication, and discipline associated with the decision to acquire foreign technology that appears to be the direct result of growing managerial accountability within the Chinese economy.[12] Such situations have been too few, however. More typical have been situations characterized by hesitation, ambiguity, and inconsistency in prerogatives allowed to managers. There has also been attitudinal resistance among many government and Party officials to continued reform because of the increased risks and uncertainties associated with competitive economic situations. In these instances, the ability of the Chinese manager to run operations in an efficient, productive, and—from a potential joint-venture partner's perspective—attractive fashion have been severely limited. That such limitations could occur, despite the conscious and sincere attempts by many high-level government officials to rationalize the economic system, shows how strong such obstructions can be.[13]

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[11] William A. Fischer, "The State of Chinese Industrial Management," in Nigel Campbell and John Henley (eds.), *Advances in Chinese Industrial Studies: Joint Ventures and Industrial Change in China* (Greenwich, CT, JAI Press, forthcoming).

One of the most unfortunate results of the reexamination and retrenchment of the Chinese reform program has been the recentralization of a number of industries and the restriction of managerial autonomy in many enterprises.[14] Under such circumstances, the vitality of Chinese industry is sapped by administrative control; the flexibility, responsiveness, and innovativeness of Chinese enterprises withers; and accountability is diluted. In the aftermath of such moves backward, the difficulties of dealing with Chinese industrial partners remain significant.[15] By its very nature, the act of rescinding policies that provide the Chinese enterprise manager with greater autonomy serve to reduce the attractiveness and utility of such partnerships to those prospective foreign investors who seek to enter China to bring technology and skills and to create viable partnerships to serve the newly emerging global marketplace. This is particularly true at a time when many foreign investors can also consider Central and Eastern Europe as alternative sites for their operations and investment. In their efforts to "protect" the existing political and economic order, the Chinese government has also moved to perpetuate the country's economic backwardness.

IV. Conclusion

The El Dorado promise of China that has attracted so many foreign suitors in the past has dimmed over the past few years. Difficulties with operations, uncertainties with government policies, the relative attractiveness of producing at home or in other developing country sites, have all served to reduce the allure of China for many foreign firms. China itself suffers from a number of infrastructure deficiencies that both make it hard to significantly improve the situation in the immediate term as well as constrain its ability to independently move away from the mass production of standardized items as its prevailing export growth path. The conclusion that can be drawn is that now, more than ever, China needs to sustain its commitment to export-led growth, but also to recognize that such growth will be necessarily different from those historical experiences of other East Asian NICs. In particular, China appears to be in a situation where more widespread and more intimate relationships with foreign firms are essential in order for it to overcome the barriers that exist today for her exports, as well as the impediments of her infrastructure deficiencies.

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[12] Denis F. Simon and William Fischer, *Technology Transfer to China* (Cambridge, MA, Ballinger, forthcoming).

[13] In a study being conducted by the author in another developing country, a particularly successful owner/manager of a local firm stated that the secret of his success was being able "to forget that I am in the developing world. If I even believe that I am in the developing world, I am lost! I must constantly believe that I am operating in the world market." It is doubtful that such a managerial attitude would be possible in many places in China today.

[14] James Stepanek, "Companies Prepare for Post-Deng Reforms in China," *The Wall Street Journal/Europe*, February 20, 1990, p. 9; Louise do Rosario, "Three Years'Hard Labour," *Far Eastern Economic Review*, November 30, 1989, pp. 68–69; and Louise do Rosario, "Eternal Mandarins," *Far Eastern Economic Review*, November 9, 1989, pp. 33–34.

[15] Oded Shenkar, "International Joint Ventures' Problems in China: Risks and Remedies," *Long Range Planning*, vol. 23, no. 3, pp. 82–90.

Central to China's dilemma relating to export-led growth is the realization that low-wage labor is no longer a particularly compelling comparative advantage. Furthermore, China is no longer the only attractive location within the developing world from which to export. China's unique asset, however, is nearly a fifth of the world's population in a relatively untouched market. It is this market potential, rather than cheap labor, that is China's real comparative advantage, and her ticket to advanced technology and managerial skills. How she chooses to utilize this comparative advantage will be a major policy decision for her leaders. It must be made, however, in the face of weak competitive strength among her industrial enterprises and continuing frustration for her managers who seek to exercise their operating responsibilities.

CHINA'S RELATIONS WITH MULTILATERAL ECONOMIC INSTITUTIONS

By William R. Feeney [*]

CONTENTS

Page
Summary 795
I. China and the United Nations Development Program 797
II. China and the World Bank Group 799
III. China and the Asian Development Bank 809
IV. China and the GATT 811
V. Conclusions 814

SUMMARY

For more than a decade, China's long-term economic development strategy has been predicated upon the creation of a viable domestic economy using a variety of market incentives and the adoption of Ricardo's international trade theory of comparative advantage. This development approach utilizes the twin engines of domestic production incentives and greatly expanded foreign loans, credits, and investments and international trade within the framework of the world capitalist economic system to generate the wealth necessary to build a modern economy. China's current support for the contemporary world economic system stands in sharp contrast to Beijing's earlier system-transforming posture adopted soon after the 1949 Communist Revolution, initially in conjunction with the Soviet Union and later as the self-proclaimed radical leader of the Third world, and to its subsequent system-reforming approach of the early 1970s based upon Third World-oriented New International Economic Order (NIEO) principles.[1]

An integral part of China's integration into the global economic system has been membership and active participation in a variety of multilateral economic institutions (MEIs).[2] Beginning in late 1978, China acknowledged the need for external development assistance by shifting from the status of an aid-giver to an aid recipi-

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[1] See Samuel S. Kim, "Post-Mao China's Develoipment Model in Global Perspective," in Neville Maxwell and Bruce McFarlane, eds. *China's Changed Road to Development* (Oxford: Pergamon Press, 1984), pp. 214–15.

[2] See my chapters, "Chinese Policy in Multilateral Financial Institutions," in Samuel S. Kim, ed. *China and the World; Chinese Foreign Policy in the Post-Mao Era* (Boulder, Col.: Westview Press, 1984), ch. 11; and "Chinese Policy in Multilateral Economic Institutions," in Samuel S. Kim, ed. *China and the World; New Directions in Chinese Foreign Relations,*, 2nd ed. (Boulder, Col: Westview Press, 1989), ch. 10; and especially Harold K. Jacobson and Michel Oksenberg, *China's Participation in the IMF, the World Bank, and GATT; Toward a Global Economic Order* (Ann Arbor, Mich.: University of Michigan Press, 1990).

ent within the framework of the United Nations Development Program (UNDP). Subsequent policy pronouncements reinterpreted China's long-standing policy of self-reliance to permit direct foreign investment and economic aid, loans, and credit from both bilateral and multilateral sources. As an outgrowth of the Open Door policy adopted in February 1980, China sought and was granted admission into the World Bank Group, or WBG (a collective term for the International Monetary Fund, or IMF; the International Bank for Reconstruction and Development, or IBRD, but commonly called the World Bank; and its affiliated agencies, the International Development Association, or IDA, and the International Finance Corporaiton, or IFC). In 1983 China was granted observer status in the world trading organization, the General Agreement on Tariffs and Trade (GATT). In 1986 China made formal applcation for full GATT membership and joined the Asian Development Bank (ADB).

China has been a MEI participant for a decade, and during that period membership in these organizations has represented both a challenge and an opportunity for Beijing. The absorption of 1.1 billion people into the world and regional economy has not been without its difficulties and problems. On balance, both China and the world have reaped great benefits both from the intangible psychic perspective of linkage and belonging and from the more tangible economic rewards of enhanced prosperity and well-being.

Prior to June 1989 the multidimensional MEI connections which had been forged appear to have laid the groundwork for even further integration of China into the global economic and political system. The June 4, 1989 Tiananmen Square massacre and the subsequent wave of political repression against the democracy movement in China came as a shock of the first magnitude both inside and outside the country and raised serious questions about the permanence and viability of China's participatory role in the global economic system. These events prompted a series of moves by the United States, other G–7 countries, and select MEIs to isolate and penalize China's hard-line leaders. Within two weeks of the crackdown and largely at the behest of the United States, both the World Bank and the Asian Development Bank suspended over $1 billion in loans and credits to China. Bilateral aid programs bankrolled mainly by Japan and the European Community were also placed on hold. And somewhat later the U.S. Congress voted to impose sanctions including the restriction of funds for certain MEI lending to China. Though the UNDP country program in China was not adversely affected, further negotiations on China's GATT membership application were temporarily postponed. Finally, hundreds of foreign firms doing business in China were forced to reevaluate the more uncertain commercial climate and their future economic prospects within a potentially more orthodox Marxist-Leninist political environment.

This chapter focuses upon China's participation in a number of key MEIs since 1979, the nature and consequences of China's relationships with those organizations, the impact of the Tiananmen Square incident on those linkages, and the implications for both China and the global community for the 1990s.

I. China and the United Nations Development Program

China's participation in the UNDP has been the longest of any MEI relationship and began as an adjunct to Beijing's NIEO revisionist orientation soon after the PRC delegation was seated in the United Nations in 1971. In November 1972 China began to take part in UNDP pledging conferences and over the next seven years participated in a number of UNDP supported programs in Asia and Africa. In 1974, China made token contributions in non-convertible renminbi to the organization. In January 1975 China agreed to serve on the UNDP Governing Council, but over the next four years steadfastly refused to accept any UNDP assistance despite its technical eligibility.[3] During this time, China argued that the UNDP approach was ill-conceived and overly limited. Rather than concentrating on technical assistance for Third World countries in the form of pre-investment planning and management, advisory services, fellowships, and demonstration and training, the UNDP role should be expanded across the entire development spectrum in line with the NIEO approach. In November 1978 China unexpectedly shifted gears and sought UNDP assistance, which was approved by the UNDP Governing Council despite displeasure on the part of some Third World states and the Soviet Union and its allies. Much of that concern derived not only from added competition for UNDP aid but also from what later appeared to be artificially deflated and self-serving per capita income statistics used to justify higher aid allotments.

China has done well in its relationship with the UNDP. In 1978 China paid the UN US $27.1 million in regular dues and token contributions and received nothing in UNDP aid. Though the application deadline for the UNDP's second Indicative Planning Figure (IPF-2), or the 1977-81 aid disbursement cycle, had passed, China was able to lobby successfully for a US $15 million grant for the last three years of the cycle (1979-81) which was combined with US $12.5 million from other sources to fund 27 specific projects pending the establishment of China's regular allotment of UNDP resources. In September 1979 the UNDP opened an office in Beijing. Thereafter, China made determined efforts to develop and justify a broad range of technical assistance projects. From IPF-3 (1982-1986), China's First Country Program (CP-1) received some US $66 million (an increase of 340 percent), which was combined with US $15 million in funding from the government and other sources to implement more than 150 projects. IPF-4 (1987-1991) has been even more beneficial to China and increased UNDP assistance to China's Second Country Program (CP-2) (1987-1990) by another 106 percent to US $135.9 million, or an overall total of US $163.1 million to finance over 200 projects. Finally, IPF-5 (1992-1996) tentatively has alloted some US $177.3 million or about 4 percent of its total resources of US $4.476 billion to China. Thus, China's Third Country Program (CP-3), which will run from 1991-1995, will receive about US $140 million, up somewhat compared to the earlier CP-2 level. Cumulatively since 1979, China has received nearly US

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[3] For a survey of this early relationship, see Samuel S. Kim, *China, the United Nations, and World Order* (Princeton, N.J.: Princeton University Press, 1979), pp. 318-28.

$217 million to fund more than 350 projects, making China the largest single recipient of UNDP resources.

Since 1979 the UNDP/China partnership has grown dramatically from a modest initial program to a large-scale commitment (see Table 1).[4] These resources have helped the world's largest developing country to gain access to some of the most advanced technology and technical expertise, which in turn has made an important contribution to China's modernization program. The UNDP program has promoted dialogue and cooperation between a large number of Chinese national, provincial, and municipal officials, UNDP personnel, and representatives of UN specialized agencies. Indeed, the UN system has contributed over 2000 short-term experts and consultants who have provided instruction, insights, and suggestions in a broad number of areas. Through cost sharing, the UNDP has mobilized additional resources from the PRC government, other governments and international agencies, and private sources. The UNDP has funded such programs as TOKEN (Transfer of Knowledge through Expatriate Nationals), which brings back overseas Chinese specialists for two-to eight-week consultancies, and STAR (Senior Technical Advisers' Recruitment Program) for similar visits by non-Chinese experts. Finally, the UNDP has emphasized specialized training, pre-investment surveys, technology transfer, and highly useful small-scale projects in energy development, agriculture, fishing, forestry, industry, environment, information processing, and rural development.

TABLE 1. UNDP Country Programs in China

Country Program (CP)	No. Projects	Funding (US$M)		
		UNDP	PRC/Other	Total
Ad hoc Initial Program (1978–81)	27	15.0	12.5	27.5
UNDP–CP1 (1982–86)	[a] 150+	66.0	15.0	81.0
UNDP–CP2 (1986–90)	[a] 200+	135.9	27.2	163.1
Totals (1978–90)	[a] 350+	216.9	54.7	271.6
UNDP–CP3 (1991–95)	NA	[b] 135.0	[a] 30.0	[a] 165.0

[a] UNDP projects do not necessarily conform chronologically to the CP cycle.
[b] Tentative figures.
Sources: United Nations Development Program, *UNDP in China, New York: UNDP, September 1989*, pp. 5–6; *United Nations Development Programme, UNDP Advisory Note on the Third Country Programme for the People's Republic of China (1991–1995)*. Beijing, China: UNDP, January 1990, pp. 2, 4.

The events of June 1989 had little perceptable impact on the UNDP/China partnership. Prior to that time, the mid-term CP-2 review which took place in March–April 1988 had resulted in a modest expansion of UNDP activities in China. Not only was a sixth program (economic reform and policy research) with 14 new projects worth US $16 million appended to the five already in place (increased food production and agricultural productivity, increased production of consumer goods and services, energy development and conservation, human resources development, and infrastructure development), but six new agricultural projects valued at US

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[4] For a survey, see United Nations Development Program, *UNDP in China* (New York: UNDP, September 1989).

$8.6 million were added to the existing agriculture program.[5] The immediate impact of the June upheaval was the evacuation of two-thirds of the 12 UNDP officers and most of the office staff from Beijing and a formal diplomatic note to the PRC government concerning the safety of UNDP personnel. The UNDP office remained open and continued to function, and within two weeks when order was restored the full staff returned. There was also a subsequent review of all UNDP projects in the pipeline. The major rationale was to determine their desirability and feasibility in the light of possible changes in the host government's priorities and altered practical circumstances. As a result one small US$3-400,000 project jointly funded by the UNDP and the Ford Foundation and administered by the World Bank was suspended due to the restructuring of the host institution, but no projects were cancelled.

The major thrust of UNDP activities in China is continuing support for the economic program of the government, which in September 1988 was forced to adopt a far-reaching economic austerity program including greater emphasis on state ownership and control, central planning, and self-reliance. The events of June 1989 forced an even greater reliance on such measures in order to regain control of a volatile political and economic situation. Despite these developments UNDP officials generally believed that the Chinese leadership would continue to adhere to economic reform and the Open Door policy and that the UNDP program would support that commitment. For a time several factors seemed to support this conclusion. First, the core team within the China International Center for Economic and Technical Exchanges (CICETE), which is part of China's Ministry for Foreign Economic Relations and Trade (MOFERT) and responsible for the selection, formulation, and execution of UNDP projects, had not shown any inclination to depart from the existing reform program in preparing China's CP-3. Second, there had been a formal endorsement of China's reform commitment in the UNDP Advisory Note published in January 1990.[6] Finally, all sectors continued to assume as in the past that the UNDP's CP-3 would be closely linked to China's Eighth Five Year Plan which is pledged to reform. However, recent indications seem to suggest that China's future economic reform efforts may be scaled back.[7] Thus, it is possible that those portions of China's UNDP CP-3 which are directly related to or supportive of China's earlier economic reform commitments could be reformulated or downgraded in the future.

II. CHINA AND THE WORLD BANK GROUP

China's relationship with the World Bank Group has also experienced profound changes over time. After the 1949 Communist Revolution and up until its 1971 seating in the UN, China continually disparaged the WBG as "citadels of international capitalism." Beginning in 1979 as part of its new modernization strategy, China suspended the usual WBG criticism and called for a restoration of its participation in the WBG. Strenuous efforts were made during 1979–80 which ultimately led to China's formal entry into the International Monetary Fund on April 17, 1980 and the World Bank and its affiliated agencies (IDA and IFC) on May 15, 1980.[8]

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[5] United Nations Development Programme, *UNDP Advisory Note on the Third Country Programme for the People's Republic of China (1991-1995).* (Beijing: UNDP, January 1990), p. 4.

[6] See *ibid*, pp. 11, 24.

[7] See Robert Delfs, "Reverse Engines," *Far Eastern Economic Review* (hereafter cited as *FEER*) 149 (September 27, 1990): 12-13.

An important prerequisite for effective WBG assistance to China was a comprehensive study and analysis of the Chinese economy. In an intensive year-long effort, a 30-member World Bank team launched the most exhaustive study ever undertaken of the Chinese economy and by June 1981 produced a lengthy 3-volume report which examined five priority sectors: human resources (education, health, and population), agriculture, transportation, energy, and industry.[9] A major conclusion was that future Chinese growth would depend mainly upon improved efficiency and resource use and more specifically on medium-and long-term planning; gradual price deregulation of producer but not consumer goods; optimizing and decentralizing investment decisions; skilled labor reallocation; an increase in foreign trade and trade reforms based upon greater freedom for importers, exporters, producers, and consumers, and on cost-benefit analysis of trade options. Special attention was devoted to a number of economic sectors: agriculture, energy (petroleum, coal, electricity/hydropower) and its conservation; transportation; trade expansion; and the export role of raw materials (especially oil and coal), textiles, and other light manufactures. Advanced technology imports and education were deemed critical to China's manufactured exports in the world market. Because projected export earnings, direct investment, and net transfers were considered insufficient to cover import-financing requirements, the report concluded that China would need to borrow foreign funds at a rate commensurate with the desired rate of growth.

This report was soon followed by an extensive analysis of development issues and options and thereafter by a series of focused sector studies which pinpointed specific problem areas, resources, and needs. Accordingly, the World Bank in close collaboration with Chinese officials has been able to develop a thorough array of well-researched studies on the various impediments to China's economic modernization and a lengthy list of recommendations and specific projects designed to surmount these barriers.[10]

China's relationship with the IMF was highly advantageous and useful during the decade of the 1980s. The major functions of the IMF for member states are to facilitate the balanced growth of international trade, promote foreign exchange stability and eliminate exchange restriction, overcome temporary balance of payments problems through the use of general Fund resources, and promote overall international monetary cooperation. On a number of occasions since 1980, China has turned to the IMF for assistance in dealing with assorted economic problems. In response to domestic economic difficulties and a sharp foreign trade deficit, China made its first IMF drawings from the reserve tranche in December 1980 and January 1981 in the combined amount of SDR 368.1 million (US $478 million) (see Table 2). The following March China received another loan of SDR 309.5 million (US $365 million) from the IMF Trust Fund and utilized its first credit tranche in the amount of SDR 450 million (US $550 million). In return, China pledged to readjust its modernization strategy, eliminate its budget deficit, control the growth of its money supply, lower inflation, and reduce its foreign trade deficit. During its first year of membership China borrowed nearly US $1.4 billion and successfully implemented an economic stabilization program. In May 1983 China announced that it would repay its first credit tranche drawing early, and did so by the end of 1984.

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[8] For a survey of this process, see Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, ch. 3.

[9] See World Bank, *China: Socialist Economic Development*, 3 vols. (Washington, D.C.: IBRD, 1983).

[10] See World Bank, *China: Long-Term Development Issues and Options* (Baltimore and London: The Johns Hopkins University Press, 1985). For a complete listing of World Bank publications on China, see Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, pp. 176–79.

In mid-1984 China's balance of payments position again began to deteriorate, a situation aggravated a year later by a 60 percent surge in imports and lower oil export earnings. In response, China tightened its financial policies and economic management, raised interest rates, and between January 1985 and July 1986 discouraged imports and increased exports by means of a 32 percent decline in the value of the renminbi (including a 15.8 percent devaluation). In November 1986, the IMF approved a 12-month stand-by first credit tranche arrangement for up to SDR 597.7 million (US $717 million) to support these efforts, but a rapid economic turnaround precluded its use.[11] More recently in 1988–89, excessive money supply expansion confronted China with an overheated 11 percent growth rate and escalating double-digit inflation. In September 1988 China responded with an extended 3-year austerity program which ultimately included a further 21.2 percent currency devaluation in December 1989. While Beijing recently has experienced a deteriorating international trade balance, falling foreign exchange reserves (US $19.1 billion as of April 1990), and an escalation of its foreign debt to a projected US $50 billion, thus far China has not needed additional IMF assistance.[12]

The Tiananmen Square incident undoubtedly has aggravated China's earlier economic troubles. While the current Persian Gulf crisis should lead to higher near-term oil export revenues for China, the attendant rise in world interest rates, potentially lower non-petroleum export earnings from a world economic slowdown, increased borrowing costs due to China's recently down-graded credit rating, and the threat of a continued Chinese international trade imbalance and foreign exchange reserves decline could make it increasingly difficult for Beijing to service its foreign debt, which will peak in 1992 at some US $4.2 billion annually.[13] Thus, China could be forced to seek additional IMF assistance in the near term.

China has also enjoyed a highly beneficial relationship with the World Bank and its IDA and IFC affiliates. The primary purpose of the 152-member World Bank (IBRD), the 138-member IDA, and the

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[11] See Feeney, "Chinese Policy in Multilateral Economic Institutions," pp. 242–44; and Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, pp. 121–26.

[12] Louise do Rosario, "Foreign Accounting," *FEER*, 145 (July 27, 1990): 56–7; and "A Dictator's Way," *The Economist* (London) 314 (March 24, 1990): 35.

[13] Rosario, "Foreign Accounting," pp. 56–7.

TABLE 2. China's IMF Drawings, 1980–1990

(in millions of SDRS; U.S. Dollar Equivalents in Parentheses)

Date of Inception/Expiration	Source/Amount	Terms
December 1980	Reserve Tranche SDR 218.1 (US $278) [a]	Interest-free; no service fee; indefinite repayment schedule (repaid)
January 1981	Reserve Tranche SDR 150 (U.S. $200)	Same as above (repaid)
March 2, 1981/December 31, 1981	First Credit Tranche SDR 450 (U.S. $550).	6.4% interest; 0.5% service fee; 3–5 year repayment (repaid 1984)
March 31, 1981/March 30, 1991	IMF Trust Fund SDR 309.5 (U.S. $365)	0.5% interest, 10-year repayment
November 12, 1986/November 11, 1987	First Credit Tranche (standby) SDR 597.7 (*.S. $717).	5.97% interest [b]; 0.25% service fee, 3–5 year repayment
Total IMF Drawings 1980–1990: U.S. $2,110		

[a] The SDR (Special Drawing Right) is the composite value of a weighted basket of selected national currencies, the value of which varies over time against individual national currencies. The SDR is an artificial international reserve unit and can be used to settle accounts among central banks. The advantage over individual national currencies is its greater relative stability.

[b] Since August 1983, the SDR interest rate has been determined weekly by reference to a combined market interest rate, which is the weighted average of interest rates on specified short-term domestic obligations in the money markets of the same five countries whose currencies are included in the SDR valuation basket.

Sources: Friedrich W. Wu, "External Borrowing and Foreign Aid in Post-Mao China's International Economic Policy: Data and Observations," *Columbia Journal of World Business* 19 (Fall 1984): 57; International Monetary Fund, *Annual Report 1981* (Washington, D.C.: IMF, 1981), pp. 83, 103–104, 120; International Monetary Fund, *Annual Report 1987* (Washington, D.C.: IMF, 1987), pp. 79, 152, 162.

135-member IFC has been to direct large-scale financial resources from the developed to the less developed countries (LDCs) in order to improve LDC living standards. IBRD loans and IDA credits support a wide variety of projects in agriculture and rural development, development finance, education, energy (electric power, oil, gas, coal), industry, population, health, and nutrition, technical assistance, telecommunications, transportation, urban development, and water supply and sewerage.[14] World Bank loan capital is subscribed by its member countries, borrowed on world capital markets, and is also generated by retained earnings and loan repayments. IDA credits are derived mostly from member subscriptions, periodic replenishments by the developed members, and net IBRD earnings transfers. IDA resources have been replenished eight times with the most recent tentative agreement for IDA–9 (1991–1993) in the amount of US $15.5 billion (a 12 percent increase over IDA–8).[15] Finally, the IFC provides equity capital and loans on a smaller scale to aid private and mixed enterprise, especially in Third World members, technical assistance, and investment and management advisory services.

China has been singularly successful in securing World Bank financial assistance in implementing its Open Door modernization policy. Between 1981 and 1990 China has received over US $9.2 billion in loans and credits for some 83 projects, with IBRD loans accounting for US $5.28 billion, or 57.3 percent of the total commitment, and IDA credits contributing nearly US $3.93 billion, or 42.6 percent (see Table 3).

Since 1983 World Bank assistance to China rose each year and peaked in 1988 at nearly US $1.7 billion. In 1989 the US $1.35 billion in lending represents only the first six months of the year and would have been substantially higher in the absence of the suspen-

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[14] IBRD loans are for 15–20 years and charge current market interest rates; IDA credits are for 50 years (40 years for the poorest LDCs and 35 years under certain conditions) with no interest but a small commitment fee.

[15] The World Bank, *Annual Report 1990* (Washington, D.C.: IBRD, 1990), p. 39.

TABLE 3. World Bank Annual and Cumulative Lending to China, 1981–1990

(US $M)

	IBRD		IDA		Annual Totals		Totals		Cumulative Comparative Numerical Ranking [1]
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
1981	1	$100.0	0	$100.0	1	$200.0	1	$200.0	70/125
1982	0	—	1	60.0	1	60.0	2	260.0	63/125
1983	5	463.1	1	150.4	6	613.5	8	873.5	28/128
1984	5	616.0	5	423.5	10	1,039.5	18	1,913.0	18/132
1985	7	659.6	5	442.3	12	1,101.9	30	3,014.9	14/136
1986	7	687.0	4	450.0	11	1,137.0	41	4,151.9	11/136
1987	8	867.4	3	556.2	11	1,423.6	52	5,575.5	8/137
1988	10	1,053.7	4	639.9	15	1,693.6	63	7,269.1	6/137
1989	7	833.4	5	515.0	12	1,348.4	78	8,617.5	6/137
1990	0	—	5	590.0	5	590.0	83	9,207.5	6/139
Totals	50	$5,280.0 (57.3%)	33	$3,927.3 (42.6%)	83	$9,207.5 (100.0%)			

[1] China's ranking as a cumulative borrower compared to total WB membership.

Sources: The World Bank, *Annual Report 1981*, pp. 120, 188; *Annual Report 1982*, pp. 118, 184; *Annual Report 1983*, pp. 126, 218; *Annual Report 1984*, pp. 139, 210; *Annual Report 1985*, pp. 145, 166; *Annual Report 1986*, pp. 137, 158; *Annual Report 1987*, pp. 139, 160; *Annual Report 1988*, pp. 131, 152; *Annual Report 1989*, pp. 158, 178; *Annual Report 1990*, pp. 156, 178.

sion of project approvals prompted by the Tianamen Square incident. Though Bank lending was selectively resumed in 1990, the totals were less than one-half of the previous year. As it was, China still retains the ranking of sixth largest combined IBRD/IDA borrower (eleventh largest in the IBRD and third largest in the IDA) (see Table 4). The most important project funding categories have been agriculture and rural development (US $2.38 billion or 25.8 percent), transportation (US $2.154 billion or 23.4 percent), energy (US $1.58 billion or 17.1 percent), and development finance (US $1.1 billion or 11.9 percent) (see Table 5).

TABLE 4. Summary of Cumulative IBRD Loans/IDA Credits to Eleven Largest Borrowers

(As of June 30, 1990) (US $ M)

Country	IBRD Loans			Country	IDA Credits			Country	Combined Lending		
	No.	Amount	% Total		No.	Amount	% Total		No.	Amount	% Total
1. India	134	$18,319.2	10.19	1. India	178	$16,955.7	29.12	1. India	312	$35,274.9	14.40
2. Brazil	185	17,981.6	9.63	*2. Bangladesh*	*126*	*5,248.6*	*9.02*	2. Brazil	185	17,981.6	7.34
3. Mexico	123	17,363.6	9.30	*3. China*	*33*	*3,927.3*	*6.75*	3. Mexico	123	17,363.6	7.09
4. Indonesia	147	14,829.4	7.94	4. Pakistan	82	3,237.0	5.56	4. Indonesia	193	15,761.2	6.44
5. Turkey	100	10,165.2	5.45	5. Tanzania	69	1,769.2	3.04	*5. Turkey*	*110*	*10,343.7*	*4.22*
6. Rep. of Korea	92	7,154.0	3.83	6. Ghana	51	1,448.7	2.49	*6. China*	*83*	*9,207.5*	*3.76*
7. Philippines	114	6,751.1	3.62	7. Kenya	49	1,397.4	2.40	7. Pakistan	153	7,412.1	3.03
8. Colombia	125	6,533.6	3.50	8. Sudan	47	1,336.9	2.30	8. Rep. of Korea	98	7,264.8	2.97
9. Yugoslavia	89	5,814.7	3.12	9. Sri Lanka	50	1,323.8	2.27	9. Philippines	117	6,873.3	2.81
10. Nigeria	*79*	*5,594.2*	*3.00*	10. Ethiopia	47	1,264.8	2.17	10. Colombia	125	6,553.1	2.68
11. China	*50*	*5,280.2*	*2.83*	11. Uganda	37	1,090.6	1.87	11. Nigeria	83	5,850.6	2.39
Totals [1]	3,176	$186,661.7	100.0		2,005	$58,220.0	100.00		5,181	$244,883.7	100.00

[1] These figures are cumulative totals for all member countries.

Source: The World Bank, *Annual Report 1990* (Washington, D.C.: IBRD, 1990), pp. 178–81.

The immediate effect of the Tiananmen Square incident was the evacuation of much of the staff of the World Bank resident mission in Beijing for about ten days to ensure their personal safety. During that time, World Bank officials, under intense pressure from the international community, deferred discussions on a number of pending loan approvals. On June 26, 1989 a decision was made largely at the urging of the Bush administration to postpone approval for US $780 million in new loans and credits to China.[16] The ramifications of this action were far-reaching and very costly to China. Though on-going projects continued to be implemented and preliminary planning continued for some 44 projects, the approval hiatus ultimately has delayed more than US $7.1 billion in new funding (see Table 6). This action also had a tripwire effect on the third round of Japan's bilateral assistance program for China worth some US $5.8 billion as well as future lending by the Asian Development Bank (see *infra*) and the international banking community.

TABLE 5. World Bank Lending to China by Category, 1980–90

Project Category	No./Percent projects	Loand/Credits (US$M)		WB AID Total/Percent
		IBRD	IDA	
1. Agriculture and Rural Development	23 (27.7%)	$312.3	$2,067.7	$2,380.0 (25.8%)
2. Development Finance Companies	6 (7.2%)	924.6	175.0	1,099.6 (11.9%)
3. Education	9 (10.8%)	145.3	705.9	851.2 (9.2%)
4. Energy	13 (15.7%)	1,578.9	—	1,578.9 (17.1%)
5. Industry	6 (7.2%)	621.1	—	621.1 (6.7%)
6. Population, Health, Nutrition	3 (3.6%)	15.0	202.0	217.0 (2.4%)
7. Technical Assistance	3 (3.6%)	—	50.7	50.7 (0.6%)
8. Transportation	17 (20.5%)	1,638.0	516.0	2,154.0 (23.4%)
9. Urban Development	2 (2.4%)	45.0	130.0	175.0 (1.9%)
10. Water Supply and Sewerage	1 (1.2%)	—	80.0	80.0 (0.9%)
Totals	83 (100.0%)	$5,280.2	$3,927.3	$9,207.5 (100.0%)

Source: The World Bank, *Annual Report 1981*, pp. 122–26; *Annual Report 1982*, pp. 120–24; *Annual Report 1983*, pp. 128–33; *Annual Report 1984*, pp. 142–46; *Annual Report 1985*, pp. 147–52; *Annual Report 1986*, pp. 140–44; *Annual Report 1987*, pp. 141–46; *Annual Report 1988*, pp. 133–38; *Annual Report 1989*, pp. 160–65; *Annual Report 1990*, 158–63.

Following the December 1989 Scowcroft China mission, and the lifting of martial law in Beijing the following month, the Bush administration authorized a partial relaxation of the World Bank lending freeze for so-called basic human needs (BHN) projects. From that time until the Summer of 1990, six IDA projects worth US $654 million have been approved: (1) a US $30 million IDA credit for earthquake relief in Shanxi and Hebei provinces on February 8, 1990; (2) a US $60 million IDA credit for agricultural development in Jiangxi province on February 27, 1990; (3) a US $50 million IDA credit for vocational and technical education on March 27, 1990; (4) a US $300 million IDA credit for a national afforestation project on May 29, 1990; (5) a US $150 million IDA credit for an agricultural development project in Hubei province on June 16, 1990; and (6) a US $64 million IDA credit for the Mid-Yangtze Development project on August 9, 1990.[17]

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[16] "World Bank on China Aid," *New York Times* (hereafter cited as *NYT*), June 27, 1989, p. 43.

[17] World Bank documents.

World Bank officials led by President Barber Conable have pressed for a full-scale resumption of Bank lending to China on the grounds that under the Bank's Charter, loan decisions should be made on the basis of economic rather than political criteria. While the Bush administration has responded to calls by the U.S. business community for economic normalization by lifting the ban on lending to China by the Export-Import Bank in December 1989 and by extending China's most-favored-nation (MFN) trade status for another year against determined congressional opposition the following May, the White House has been reluctant to support full World Bank normalization for several reasons. First, there is a belief that the prospects for normalization can be used as effective leverage to bolster moderate elements within the Chinese leadership, improve China's human rights performance, and encourage economic liberalization policies. Second, a strong "sustain indignation" school persists in the U.S. Congress which cuts across party and ideological lines and includes substantial numbers of conservative Republicans and three key Democratic congressmen (Rep. Henry B. Gonzalez, Chairman of the House Banking Committee; Rep. David R. Obey, Chairman of the Foreign Operations Appropriation subcommittee, and D.C. delegate Walter E. Fauntroy, Chairman of the banking committee's International Development and Finance Subcommittee).[18] Finally, and most important, the administration was wary of further antagonizing American public opinion so soon after the MFN retention decision. It is likely that the Bush administration will continue its policy of selective BHN-type project approvals, the definition of which can be broadened or narrowed as circumstances warrant until China makes the appropriate human rights and economic liberalization concessions. Such flexibility was apparent in the joint statement issued by the Group of Seven (G–7) industrial countries at the Houston summit in July 1990 which expanded the BHN criterion to include World Bank loans to address environmental concerns.[19] It may also be that a number of conciliatory gestures made by China during the Spring and Summer of 1990 together with Chinese support in the United Nations Security Council for the U.S. position in the Persian Gulf crisis could provide the necessary catalysts to defuse congressional and public opposition and permit normalized World Bank lending by the first half of 1991.

China's relationship with the International Finance Corporation has been far less extensive than with the other WBG agencies.[20] For the first few years of its World Bank participation, China, though technically eligible even as a socialist country, chose not to seek IFC funds for private and mixed enterprises. However, in 1985 China obtained a US $15 million IFC loan to finance the Guangzhou Peugeot Automobile Company, Ltd., a joint French-Chinese motor vehicle production venture. In 1987 the IFC approved two additional China-related investments. The first was a US $5 million loan to the China Bicycles Company, Ltd. to expand production to 1

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[18] Clyde H. Farnesworth, "China Gets One Loan, but Another Is Put Off," *NYT*, May 30, 1990, pp. Cl, C2. See also Susuma Awanohara, "No More Favours," *FEER*, 148 (June 7, 1990): 56–7.

[19] "The Houston two-step," *FEER* 149 (July 19, 1990): 57.

[20] For a brief survey, see Feeney, "Chinese Policy in Multilateral Economic Institutions," p. 247.

TABLE 6. Proposed World Bank Projects in China

(as of May 15, 1990)

Project Sectors/Title Designations (Project Status) [1]	Project Loan Amount (US $M)		
	IBRD	IDA	Joint
I. Agricultural Projects (5)	$333.0	$260.0	$510.0
II. Education/Training Projects (3)	0.0	345.0	0.0
III. Environment/Pollution Control Projects (3)	270.0	100.0	0.0
IV. Finance Projects (3)	600.0	275.0	0.0
V. Health Projects (1)	0.0	100.0	0.0
VI. Industrial Projects (9)	950.0	0.0	110.0
VII. Power Projects (5)	1,060.0	0.0	87.0
VIII. Ports/Shipping Projects (1)	100.0	0.0	0.0
IX. Railway Projects (1)	350.0	0.0	0.0
X. Technical Assistance Projects (1)	0.0	20.0	0.0
XI. Transportation Projects (5)	350.0	0.0	600.0
XII. Urban Development Projects (5)	0.0	270.0	310.0
XIII. Water Supply Projects (2)	0.0	165.0	0.0
Total Projects (44): US$7,145 million	$4,013.0	$1,535.0	$1,597.0

[1] There are four preliminary stages in the World Bank project cycle prior to formal approval by the Executive Directors of the Bank. These include: I: *Identification* in which the Bank and the prospective government borrower identify specific projects that advance the development process; II: *Preparation* in which the borrower justifies the project and develops feasibility studies; III: *Appraisal* in which the Bank critically reviews all aspects of the project including implementation and evaluation; and IV: *Negotiation* between the Bank and the borrower on the measures needed.

Source: The World Bank, *International Business Opportunities Service; Monthly Operational Summary*, 13 (May 15, 1990), pp. 37–42.

million bicycles annually, 85 percent for export. The second was a US $3 million mixed equity commitment to J.F. China Investment Company Ltd. (CIC) Hong Kong, a project sponsored by the investment company of Jardine Fleming of Hong Kong to finance small- and medium-sized joint ventures in China. In 1988 a fourth IFC loan in the amount of US $15 million went to Shenzhen Crown (China) Electronics Company, Ltd. a joint Sino-Japanese venture to manufacture audio and visual consumer electronic products for export. And in 1989 the IFC made a US $2 million loan to Shenzhen-Chronar Energy Company, Ltd. to establish a plant in Shenzhen, China to manufacture solar energy amorphous silicon photovoltaic panels principally for export.

TABLE 7. IFC Commitments to China (1986–1989)

Enterprise	FY of Commitment	IFC Commitment (US $000)		
		Loans	Equity	Total
1. Guangzhou Peugeot Automobile Co., Ltd.	FY 1986	$15,000	$3,225	$18,225
2. China Bicycles Co., Ltd.	FY 1986	5,000	0	5,000
3. J.F. China Investment Co., Ltd.	FY 1988	3,000	36	3,036
4. Shenzhen Crown (China) Electronics Co., Ltd.	FY 1989	15,000	0	15,000
5. Shenzhen-Chronar Solar Energy Co., Ltd.	FY 1989	2,000	1,000	3,000
Totals		40,000	$4,261	$44,261

Source: International Finance Corporation, *Annual Report 1989* (Washington, D.C.: IFC, 1989), p. 78.

Compared to the magnitude of IBRD/IDA commitments, the US $40 million in IFC loans to China is a relatively minor amount (see Table 7), and formal approval for the small number of projects in the pipeline has also been blocked. The future expansion of the China-IFC partnership once the lending freeze is lifted will depend not only upon a recognition by the former of the utility of the role of private venture capital in China's economic development and the linkage between such capital and overall investor confidence, but especially on China's policy commitment to joint equity ventures and economic liberalization and reform. That linkage could be strengthened in the short term if China follows up on its April 1990 adherence to the convention which established the Multilateral Investment Guarantee Agency (MIGA), organized in April 1988 as the fourth agency of the World Bank Group. MIGA was designed to encourage and guarantee private investment against various non-commercial risks in the Third World, advise developing member governments on the design and implementation of policies, programs and procedures related to foreign investment, and to sponsor a dialogue between host governments and the international business community on investment issues. Though China has not yet contracted for any MIGA projects, the staff of the Foreign Investment Advisory Services (FIAS), a joint MIGA-IFC component, has completed work on a study recommending new approaches to the problem of foreign-exchange allocation to joint ventures in China.[21] It is noteworthy from a future economic policy perspective that China has chosen to join the 58-member body.

Since 1980, China has derived a broad range of benefits from membership in the World Bank group. These have included: (1) the preparation and dissemination of a large number of detailed studies of virtually every aspect of the Chinese economy by highly skilled World Bank and IMF analysts; (2) periodic balance of payments and budgetary deficit assistance through the IMF; (3) the availability of a large pool of lending capital principally in the form of IBRD and IFC loans and IDA credits to expand domestic production and productivity in a broad range of primary and finished products for domestic consumption and foreign trade and to finance a large number of costly infrastructure projects necessary for rapid modernization; and (4) an extensive array of IMF and IBRD-sponsored technical training and educational opportunities in the form of courses, seminars, colloquia, and symposia in virtually every aspect of international economic activity for mid-and top-level career functionaries at staff headquarters in Washington and the staff missions in Beijing and through the IMF Institute and the World Bank's Economic Development Institute (EDI). Not only is China the only country to have its own EDI program, but approximately one-quarter of the EDI budget is devoted to training Chinese officials.[22]

The overall importance of China's relationship with the WBG cannot be underestimated. Not only have World Bank analyses had a profound impact upon the economic decisions of the Chinese political leadership, but Bank interaction has prompted the creation of an extensive government bureaucratic structure to deal specifically with the MEIs. In addition, it has been noted that World Bank reports have played an important role in the formulation of China's five year plans, and IBRD and IDA funded projects have become an integral part of that planning cycle. In the long-run, however, it is probably the socialization function of WBG training which will have the most pronounced and enduring impact on the thinking, understanding, and actual future decisions of a large cadre of China's present and future economic and financial bureaucratic elite. One inescapable conclusion is that any significant rupture in that symbiotic relationship would have profoundly negative consequences for China's future economic prospects.

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[21] The World Bank, *Annual Report 1989* (Washington, D.C.: IBRD, 1989), p. 103.

[22] See Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, pp. 109, 122, 124, 140–43, 146–49, 151-52.

In terms of its relations with other states, China's participation in the WBG has had a variety of consequences. First, though China has long identified with the Third World and has consistently supported the reformist positions of the so-called Group of 24, the LDC lobby in the WBG, Beijing is not a formal member of the group and has not assumed a leading Third World advocacy role within the organization.[23] Second, China's entry into the WBG has had a negative impact on other Third World members who have been faced with much greater competition for limited resources. Though this problem has not developed within the IMF, in a serious economic downturn available resources could become substantially more constrained despite a 50 percent quota increase in June 1990. Far greater competitive resource pressure has occurred in the case of IBRD loans and IDA credits. Not only has China absorbed large amounts of IBRD market interest capital, but China's increasing level of concessionary IDA borrowing has occurred in large part at the expense of such Third World countries as India, Bangladesh, and Pakistan. While there was a tentative decision in early 1989 to allocate fully 60 percent of all IDA credits to China and India in equal amounts, that prospect has been temporarily deferred by the lending freeze, much to the benefit of other Third World recipients.[24] China's future role in the WBG and its claims on Bank resources ultimately will depend upon political decisions made in Beijing and Washington.

III. CHINA AND THE ASIAN DEVELOPMENT BANK

On March 20, 1986 China became the 47th member of the Asian Development Bank (ADB), a relationship that has proved very beneficial for Beijing. To do so, China made a major political concession by agreeing not to press for the expulsion of Taiwan, which had been a founding member of the organization in 1966, and by acceding to separate Taiwan ADB membership under the designation China, Taipei. In departing from its long-standing refusal to accept anything remotely suggestive of a two-China formula in any international organization, China bowed to compelling political reality on two counts.[25] First, the ADB Charter stipulates that a member could be expelled only for loan default. Second, most members including the United States and Japan, which together held just over 27 percent of the votes, opposed Taipei's ouster (new members under the ADB charter had to have a 75 percent majority). Though Taiwan raised strong objections to the arrangement, after a limited boycott of Bank meetings Taiwan's representatives did attend the ADB Board of Governors meetings in Manila in April 1988 but registered an objection by covering their country's nameplate with an "Under Protest" sign. In subsequent meetings in Beijing in 1989 and New Delhi in 1990, a more pragmatic business-like approach was apparent.[26]

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[23] Feeney, "Chinese Policy in Multilateral Economic Institutions," p. 250.

[24] The World Bank, *Annual Report 1990*, p. 41.

[25] The ADB thus far is the only intergovernmental organization of which both China and Taiwan are members.

From 1986 until the Tiananmen Square incident, the ADB provided China with seven loans valued at US $416 million, 22 technical assistance projects in the amount of US $8.42 million; and a US $3 million line of private sector investment equity to the Shanghai SITCO Enterprise Co., Ltd. (see Table 8). Significantly, ADB lending to China had increased each year up to 1989, when China was scheduled to receive some US $500 million in new ADB loans. However, some US $422.5 million in fully negotiated loans for five projects was put on hold as a result of the June 1989 upheavals.[27] As has been true of the World Bank, ADB officials have pressed for a resumption of lending, but unlike the former case the United States thus far has not made exceptions based on BHN criteria. Thus, China's share of 1989 ADB program loans was allocated to other countries, increasing the average loan size by 50 percent. As of mid-1990, there was nearly US $1.3 billion in ADB financing for thirteen China projects in the preapproval or pre-disbursement stage. (see Table 9)

TABLE 8. Asian Development Bank Annual and Cumulative Lending to China, 1986–1989

(US $M)

Year	No. Loans	Amount	No. Technical Assistance Projects	Amount	No. Private Sector Operations	Amount	Total Lending Amount
1986	0	$ 0.0	1	$0.075	0	$0.0	$ 0.075
1987	2	133.3	[a]5	1.402	0	0.0	134.702
1988	4	282.9	[b]5 10	3.359	1	3.0	289.259
1989	1	39.7	[c]5 6	3.585	0	0.0	43.285
Totals	7	455.9	22	8.421	1	3.0	467.321

[a] Two of these projects were financed exclusively by the UNDP in the amount of $750,000.

[b] Five of these projects were funded exlusively by the Japan Special Fund administered through the Bank in the amount of $1.419 million; a sixth project was jointly financed by the Japan Special Fund ($0.412 million) and the UNDP ($0.418 million).

[c] Three of these projects were funded exclusively by the Japan Special Fund in the amount of $3.3 million.

Source: Asian Development Bank, *Loan, Technical Assistance and Private Sector Operations Approvals*, No. 90/105 (May 1990),pp. 1, 20, 52.

The ADB loan shutoff came at a particularly inconvenient time for China. During 1990 negotiations will begin on the sixth cash replenishment for the Asian Development Fund (ADF VI) as well as new funding for the Bank itself in the form of ordinary capital resources, or OCR. To date, neither China nor India has been eligible to draw upon concessionary rate ADF credits. But over the next four years some of the anticipated US $6.5 billion in ADF credits will be made available to both countries.[28] Finally, in August 1989 the ADB set up the Asian Finance and Investment Corporation (AFIC) comparable to the IFC which will co-finance private sector projects with the ADB. China will also lose out on this opportunity should the loan freeze continue for any protracted period of time.

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[26] See Jonathan Moore, "Pragmatic Diplomacy," *FEER* 144 (April 20, 1989): 26, and Philip Bowring, "Market Developer," *FEER* 148 (May 17, 1990): 71.

[27] Bowring, "Market Developer," p. 71.

[28] *Ibid.*

Again, not until the Bush administration and especially the U.S. Congress give the go-ahead will normal lending be resumed. Regardless of current ADB loan policies, however, the Bank does provide a useful organizational bridge between China and Taiwan to complement the dramatic growth in direct and indirect trade and to facilitate any future reconciliation process.

TABLE 9. Proposed Asian Development Bank Projects in China

Project Sectors	Project Loan Amount (US$M)
I. Agricultural Projects (2) (1–$50m)	$250.0
II. Energy Projects (1)	65.0
III. Industry and Non-Fuel Minerals Projects (4) (3–$305m) [*]	361.4
IV. Transport and Communications Projects (6) (1–$67.5m)	620.5
Total Projects (13) [a]	$1,296.9

[*] By the end of 1989 loan negotiations had been completed on five projects totaling $422.5 million, but formal approvals were suspended.

[a] In addition to new projects, the ADB has proposed spending $9,023,000 for technical assistance related to these and other projects.

Sources: Asian Development Bank, *ADB Business Opportunities, Proposed Projects, Procurement Notices and Contract Awards* 12 (June 1990), pp. 5–7, 28, 46–49; and Asian Development Bank, *Annual Report 1989* (Manila: ADB, 1989), p. 64.

IV. CHINA AND THE GATT

On July 14, 1986 China formally applied to rejoin the General Agreement on Tariffs and and Trade (GATT). The GATT is an international trade regime which encourages its 99 members to trade on the most favorable terms available by developing rules ensuring reciprocity, nondiscrimination, and transparency and by providing an institutional framework for periodic multilateral trade negotiations. China's decision was the latest stage in a lengthy and ambivalent relationship.[29] In April 1948 the Republic of China had been one of the twenty-three original members of the GATT but effectively withdrew in May 1950. Though the PRC government frequently asserted that it alone was the sole legal government of China, implying that China's withdrawal was without effect, Beijing chose not to participate in the GATT, even after its UN seating in 1971. Nevertheless, China monitored GATT activities and remained in indirect contact with GATT officials in Geneva through the United Nations Conference on Trade and Development (UNCTAD).

Between its WBG entry in 1980 and the granting of permanent observer status in November 1984, China increasingly took part in GATT-sponsored meetings and activities. In April 1980 China resumed its seat on the UN Interim Commission for the International Trade Organization (ICITO) which appoints the GATT Secretariat. In July 1981 China which was becoming a major textile exporter was granted observer status at a GATT meeting to renew the Multifibre Arrangement (MFA) which sets rules for the textile trade. In November 1982 China was granted full observer status at subsequent meetings of the Contracting Parties. In December 1983 China applied for MFA membership and was accepted the next month. Ultimately, with China's Open Door policy in full swing, its foreign trade growing rapidly (some 85 percent with GATT members), the impending start of the Uruguay Round of GATT trade negotiations, and prospects for broader access to foreign markets, China chose to make formal membership application.

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[29] See Robert E. Herzstein, "China and the GATT: Legal and Policy Issues Raised by China's Participation in the General Agreement on Tariffs and Trade," *Law and Policy in International Business* 18 (1986): 371–415; Penelope Hartland-Thunberg, "China's Modernization: A Challenge for the GATT," *Washington Quarterly* 10 (Spring 1987): 81–97; J.E.D. McDonnell, "China's Move to Rejoin the GATT System: An Epic Transition," *World Economy* (London) 10 (September 1987): 331–50; and especially Jacobson and Oksenberg, *China's Participation in the IMF , the World Bank, and GATT*, pp. 62-3; ch. 4; pp. 126–7.

GATT membership would entail both benefits and costs for China.[30] On the positive side, China would be able to increase its foreign trade earnings by strengthening its claims to MFN status (lowest prevailing tariff rates) with other GATT members and preferential export market access to the industrialized member states under the Generalized System of Preferences (GSP). China would also belong to a formal organization with rules, procedures, and protections against unfair trade practices, discrimination, and protectionism. Finally, the GATT would also be a valuable source of information and a device to promote and legitimize China's economic policies, provide trade and investment assurances to the international business and banking community, and secure its status in the international trading community.

On the negative side, GATT participation has a number of disadvantages. First, China would need to liberalize its trade policies by reducing tariffs and other trade barriers, decentralizing import and export decision-making and licensing, expanding market access through competitive bidding and limiting import substitution policies. Second, China would be required to end its own trade discrimination practices in the form of direct export subsidies and dumping (the sale of products below market cost), which are chronic problems for non-market centrally planned economies. Third, China would have to end its practices of setting hidden production and trade target levels and regulations, which are considered *nei-bu* (or internal matters), and institute greater transparency in the form of full disclosure of its trade rules and policies, pricing practices, foreign trade organizations' balances, the foreign trade plan, and market and trade data and statistics. Finally, it would have to restructure its current two-tiered exchange rate which is used to subsidize exports and revise the concept of special economic zones to ensure a unified national trade regime. Although China could invoke developing country status under Article XVIII of the GATT and avoid many membership obligations, its overall control and flexibility in managing its economy and foreign trade regime would be diminished.

The initial stage of China's GATT accession process included the receipt in February 1987 of a detailed memorandum from China describing the nature and functioning of its domestic economy and foreign trade regime. A working party was established the following May to examine this document and to draft an accession protocol based upon specific terms negotiated with China. The three-month delay in setting up the working party was due to differences over China's accession status. China contended that it was resuming its GATT membership rather than joining as a new contracting party. In the end the matter was tabled for the negotiating process. In response to China's memorandum, the contracting parties submitted a list of some 300 questions to which the Chinese responded. In February 1988 the working group met for the first time and in a series of subsequent sessions submitted and received answers to over 1200 related questions.[31]

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[30] Feeney, "Chinese Policy Toward Multilateral Economic Institutions," pp. 255–6; and Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, pp. 92–4.

In April 1988 the working party began work on a draft accession protocol to ensure that GATT rules could be applied to China's economy and foreign trade regime. This stage entailed extremely difficult negotiations because of the following obstacles: (1) intensified policy variances from GATT norms due to China's September 1988 austerity program which had expanded central economic controls, slowed domestic reforms, and raised added trade barriers; (2) the question of China's membership application status (resumed or new); (3) China's existing tariff schedule as the basis for negotiation; (4) the granting of developing status to China; and (5) U.S. extension of MFN and GSP treatment to China on an annual rather than a continuing basis.

The Tiananmen Square incident postponed the scheduled July 1989 working group meeting. When the group finally convened in earnest in December, additional questions were raised by a number of contracting parties on the whole range of issues. Since then and especially during the most recent meeting of the working group in September 1990, negotiations have remained unproductive and inconclusive.[32]

A recent GATT-related issue has also become a matter of serious concern for China. The decision of Taiwan on January 1, 1990 to apply for full GATT membership has added an additional complication to the process. Taiwan was granted GATT observer status in 1965 but was ousted after the PRC government was seated in the UN in 1971. Since then, Taiwan has become the world's 13th largest trading entity with total trade for 1989 worth US $118.5 billion and the second largest foreign exchange reserves of US $75 billion. Thus, there was ample justification for Taipei's action. China reacted angrily and accused Taiwan of seeking to secure the recognition of "two Chinas." [33] Despite the precedent of Taiwan's membership in the ADB and two other Asian MEIs (the Pacific Basin Economic Council and the Pacific Economic Cooperation Council), China's major motive was fear of losing face and a post-Tiananmen acceleration of Taiwan's "creeping officiality" in bilateral and multilateral settings.

Prior to the Tiananmen upheaval, China had assumed that once it had joined the GATT, it would sponsor Taiwan for separate membership under Article XXVI, much like Great Britain's 1986 sponsorship of Hong Kong. With China's early GATT membership prospects stalled, Taiwan decided it had little to lose by applying separately, though it sought to finesse the "two Chinas" issue by applying not as the Republic of China but rather under Article III as "The Customs Territory of Taiwan, Penghu, Kinmen, and Matsu" (the main ROC islands). Taiwan's membership initiative not only preempts the subordinate status implicit in PRC sponsorship, but also raises the possibility of an eventual WBG membership request. For the moment, Taipei's action poses a serious dilemma for the GATT. While there is sufficient support for Taiwan's entry, many GATT members also know that drafting an accession protocol and a tariff schedule for Taiwan will be far easier than for China but that to do so would risk alienating China. In the short run, the issue may serve the interests of the United States most of all, in that calculated delay provides added U.S. leverage against Beijing to press for economic reform and trade liberalization and against Taipei to force concessions to reduce the latter's US $12 billion 1989 trade surplus with Washington. In the long run both China and Taiwan have cast the GATT die, and both will have to make meaningful policy concessions to avoid unacceptable consequences.

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[31] Jacobson and Oksenberg, *China's Participation in the IMF, the World Bank, and GATT*, pp. 94–6.

[32] "GATT Reply to China Bid," *NYT*, September 21, 1990, p. C 17.

[33] Frances Williams and Jonathan Moore, "Who goes first?" *FEER* 147 (February 1, 1990): 36–7.

For the moment, however, China is in the unenviable position of potentially being frozen out of the GATT picture short of full membership. The upshot of this development will be mounting pressure on the working group and China to make the requisite policy decisions to conclude an acceptable accession protocol and tariff schedule. Failure to do so, especially in the light of rapid prospective GATT membership for the remaining non-member states of Eastern Europe and the extension in May 1990 of observer status to the Soviet Union, would invariably raise serious questions about China's future status in the world trade regime and the extent of its commitment to economic reform and the Open Door policy.

V. Conclusions

China's MEI affiliations have proved to be extremely beneficial prior to the Tiananmen Square incident. China has garnered billions of dollars in the form of grants, loans, and concessionary rate credits. These funds have been indispensable in accelerating China's modernization by financing an impressive array of infrastructural, developmental, and productive projects, broadening access to advanced technology and expertise, and greatly expanding direct foreign investment and trade, thereby integrating China into the mainstream of the global economic system. MEI membership has also brought China's bureaucratic, technical, and emerging business elites into close personal contact with numerous foreign experts. This interaction has served not only to inform and sensitize China's cadres to the psychological and methodological needs of successful economic development, but also to consolidate general vested bureaucratic career interests among all interested parties. Finally, MEI participation has conferred broad international legitimacy and acceptance upon China's political leadership and its modernization program.

The results for China's economy have been most impressive. In the short span of a decade China's foreign trade has grown from US $29.3 billion in 1979 to US $110.1 billion in 1989, a 376 percent increase, with exports rising from US $13.7 billion to US $51.8 billion, or 378 precent during the same period.[34] At the same time China's exports have soared from 5 percent to 22.2 percent of GNP, a proportion which implies that China's overall prosperity and modernization goals have become inextricably linked to international trade and continued adherence to economic reform, the Open Door policy and MEI participation, and particularly to GATT accession.[35]

However, as one leading scholar has suggested, a number of external developments including the collapse of Communism in Eastern Europe, the rise of an assertive civil society, multiparty politics, and a deteriorating economy in a fragmenting Soviet Union, and a shrinking Communist world movement (North Korea, Vietnam and Cuba) have combined with the trauma of Tiananmen Square to produce profound crises of regime re-legitimation and fundamental national identity as the "People's Republic," and a collapse of the China mystique. And it was this latter mystique which enabled China to claim and extract maximum global resources with minimum responsibilities.[36]

The current Chinese political leadership is well aware of the political and economic stakes in the aftermath of Tiananmen. Accordingly, the regime has adopted a dualistic damage limitation strategy based upon the reassertion of repressive authority and greater centralized control internally, but externally an uncritical approach to developments in Eastern Europe, the Soviet Union, and the MEIs, and carrot and stick leverage against the United States to remove international lending sanctions.[37] For China, the reality is increasing international isolation and loss of influence and status in the global arena. Having eschewed many of the tenets of traditional socialism, much of the Third World is anxious to duplicate China's success but also regards Beijing as a major competitor for foreign investment, product markets, and bilateral and MEI development resources. At the same time China has lost much of the leverage it once enjoyed from U.S.-Soviet Cold War rivalry. To compound China's problem, the political leadership succession questionc has paralyzed any definitive official commitment to economic reform and the Open Door (witness the repeated postponement of the 7th Party plenum).

To be sure, a primary goal of China's current leadership is to bring about the removal of the post-Tiananmen international sanctions. Such action would lead to the unqualified resumption of lending by the MEIs and the industrial democracies and with appropriate Chinese concessions could accelerate the GATT accession process. More important, ending sanctions would help to soften the perception that China is an unstable and unpredictably economic partner and a poor credit risk.[38] To date, the Chinese have had mixed success. The release of Fang Lizhi did lead the United States to relax in part its opposition to so-called BHN World Bank lending. In October 1990 the European Community lifted its economic sanctions against China, and in November Japan agreed to resume its 5-year multi-billion dollar development loan program. Despite conciliatory efforts by the Bush administration, China's hard-line internal policies have persuaded key elements in the U.S. Congress to maintain opposition to further relaxation of MEI lending sanctions and the renewal of China's MFN status.[39]

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[34] International Monetary Fund, *Direction of Trade Statistics Yearbook 1985*. Washington, D.C.: IMF, 1985, p. 5; and *ibid ., 1990*, p. 5. The official Chinese figure for 1989 foreign trade was US $111.6 billion. See Zhou Ying, "Nation Presses Ahead Despite Sanctions," *Beijing Review* 33 (October 1-7, 1990): 20.

[35] Robert Delfs, "Exit (World Stage Left)," *FEER* 149 (August 23, 1990): 32; and Robert Delfs, "The Long, Long Road Back," *FEER* 149 (August 23, 1990): 40.

[36] Samuel S. Kim, "Chinese Foreign Policy in the Shadows of Tiananmen: The Challenge of Legitimation," unpublished paper presented at the Nineteenth Sino-American Conference on Mainland China on "The Aftermath of the 1989 Crisis," Institute of International Relations, National Chengchi University, Taipei, Taiwan (ROC), June 12-14, 1990, pp. 22, 25, 30-1.

[37] *Ibid.*, pp. 21, 25.

The current Persian Gulf crisis has afforded China an extraordinary opportunity to achieve its goals of accelerating the removal of sanctions and normalizing its status as a major MEI borrower. With Iraq assuming the enemy spotlight, China has acquired dual leverage with the establishment of diplomatic relations with Saudi Arabia and the power as a permanent member of the UN Security Council to block UN endorsement of U.S. actions in the Gulf. Thus, China is now in an enviable position to extract significant U.S. concessions as the price for its continued support in the Security Council.[40] This strategy option might well dissipate should Iraq back down on Kuwait or if the growth of anti-war opposition in the U.S. Congress and the American public precludes the need for China's assistance. In the meantime, the time is fast approaching when China's leadership succession struggle could well force some resolution of the contradiction between China's internal regime which is committed to traditional socialism, albeit with Chinese characteristics, and the reality of China's pronounced economic linkage with the capitalist global economic system, upon which rests any real hope for achieving Beijing's future modernization goals. In the long term, because China's MEI commitments are an instrinsic and advantageous aspect of its overall modernization strategy, there is a strong likelihood that such ties will be strengthened and expanded in the future, especially once the succession issue is settled.

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[38] *Ibid.*, p. 22.

[39] During the Summer of 1990 the U.S. House of Representative voted to remove China's MFN status, but Senate inaction prior to adjournament precluded any action.

[40] See Thomas L. Friedman, "Baker Gets Help From China on Gulf," *NYT*, November 7, 1990, p. A8; and Nicholas D. Kristoff, "China Gains in Mideast Crisis But Loses Cold War Benefits," *NYT*, November 11, 1990, pp. 1, 11.

IN SEARCH OF EXCELLENCE IN CHINA'S INDUSTRIAL SECTOR: THE CHINESE ENTERPRISE AND FOREIGN TECHNOLOGY

By Roy F. Grow *

CONTENTS

	Page
Summary	817
I. Introduction	817
II. The Role of Chinese Enterprise in Acquiring Foreign Technologies	819
III. What Makes for a Successful Enterprise?	822
IV. Chinese Enterprises in the 1990s	824
V. Prospects for the Future	826

SUMMARY

The acquisition of foreign technology requires the involvement of several groups: national government authorities, local administrative officials, and enterprise managers must work together for technology transfers to occur. Of the three groups, enterprise managers—the actual end users of new technologies—are the most important. How national policies affect enterprise managers will determine the success or failure of future technology transfer projects.

I. INTRODUCTION

Seeking out and using new technologies requires faith, courage, and vision. New process and product technologies are the lifeblood of most production organizations, but they also present real challenges to those who adopt them. New technologies can change the way an organization processes inputs, alter the way people relate to one another, and rearrange the ways that tasks are accomplished.

Managers in societies around the world have faced the pressures created by the acquisition of new technologies.[1] The famed Toyota just-in-time production system grew out of the insight of Soichiro Toyoda who believed that auto manufacturing could be compared to the operation of an American supermarket. The supermarket required perishable food items to be constantly replenished on

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[1] See the discussion in Gustav Ranis and Gary Saxonhouse, "Determinants of Technology Choice: the Indian and Japanese Cotton Industries," in Kazushi Ohkawa and Gustav Ranis, *Japan and The Developing Countries* (New York: Basil Blackwell Inc., 1985), pp. 135–154. See also Louis T. Wells, Jr., "Economic Man and Engineering Man" in *Technology Crossing Borders: The Choice, Transfer, and Management of International Technology Flows* (Boston, Harvard Business School Press, 1984), pp. 47–68.

shelves by a well-trained staff that monitored the flow of product; automobile production, Toyoda believed, also could profit from the principle of rapid turnover of parts rather than the wasteful inventory-stockpiling used by many manufacturers.

After the production changes were in place, Eiji Toyoda observed that implementing the American "supermarket vision" made Toyota managers face some difficult choices since it made obsolete many of the skills possessed by office personnel and shop workers in the factory. The new vision changed forever the relationships between Toyota and all of that firm's suppliers and distributors. The flexibility of Toyota's managers in handling these changes made the difference between success and failure.

The Toyota experience illustrates an important point about the acquisition and implementation of foreign technologies. In the Japanese case, it is commonplace to see that country's "economic miracle" in terms of a general national strategy to push structural change by using foreign technologies to move industry along a sharply-inclined learning curve. Such a strategy has, indeed, been responsible for resounding success in many sectors of the Japanese economy.[2]

But in addition to—and often going beyond—the commitment of many Japanese politicians and government administrators to the general process of knowledge acquisition, have been the actions of those Japanese managers, entrepreneurs, and staff and line personnel who actually manned the enterprises and made the decisions about foreign technologies.[3] The "masters of change" in industrial societies, notes Rosabeth Moss Kantor, are most often found in the *functional* economic organizations—the industrial enterprises—that actually implement the new process or product technologies.[4]

Is the enterprise equally important in China's acquisition of foreign technologies? I have sought to answer this question during the course of ten years of work investigating more than 100 Japanese and American firms and almost 250 projects involving technology transfers to China.[5] This same question has been in my mind during several hundred interviews of corporate and government officials who have been closely involved in these projects. (Most of these interviews took place over an extended period of time, and in a number of cases I worked as a consultant for the companies or became involved in the planning process.)

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[2] Per Sorbom, "The Reception of Western Technology in China and Japan" in Erik Baark and Andrew Jamison (eds.), *Technological Development in China, India, and Japan* (New York: St. Martin's Press, 1986) pp. 35–56; Ronald Dore, *Flexible Rigidities: Industrial Policy and Structural Adjustment in the Japanese Economy 1970–1980* (Stanford: Stanford University Press, 1986) pp. 29–60; Thomas Pepper, Marit E. Janow, and Jimmy W. Wheeler, *The Competition: Dealing With Japan* (New York: Praegar Publishers, 1985) pp. 51–59.

[3] Note the discussion in Chalmers Johnson, "Political Institutions and Economic Performance: The Government-Business Relationship in Japan, South Korea, and Taiwan," in Frederic C. Deyo (ed.), *The Political Economy of the New Asian Industrialism* (Ithaca: Cornell University Press, 1987), pp. 136–164; and the discussion of "new ideas" in Toyohiro Kono, *Strategy and Structure of Japanese Enterprise* (New York: M. E. Sharpe, Inc, 1984), pp. 224–231. Much the same point is made by Daniel Okimoto in *Competitive Edge: The Semiconductor Industry in the U.S. and Japan* (Stanford: Stanford University Press, 1986), pp. 78–133.

[4] Rosabeth Moss Kantor, *The Change Masters: Innovation for Productivity in the American Corporation* (New York: Simon and Schuster, 1983), Chapt. 3. Much the same point is made in Reuven Brenner, *Rivalry: In Business, Science, Among Nations* (New York:Cambridge University Press, 1988).

[5] This research is the basis of my forthcoming book *Competing in China: Japanese and American Businessmen in a New Market*.

What I have found, I believe, is that the actions of the Chinese enterprise (and of the managers of these enterprises) increasingly lies at the heart of the entire Chinese technology acquisition process—especially in cases involving *successful* transfers of technology. It is at the enterprise level that the most important decisions about *specific* technologies—equipment, personnel, work processes—are made. And it is personnel in these enterprises—the managers, chief engineers, shop foremen—who are the key to making work the processes of seeking, accepting, and implementing foreign technologies.[6]

II. THE ROLE OF CHINESE ENTERPRISES IN ACQUIRING FOREIGN TECHNOLOGIES

In the rapidly changing Chinese reality of the 1980s, the decision to acquire foreign technology often begins with small and very specific needs that set in motion a complex and two-tiered process. The first tier in the process involves the national, provincial and local agencies that have the ability to channel the flow of foreign technologies—both hardware and software—across China. These bureaucracies can be thought of as the necessary (but not sufficient) "gateways" through which technology transfers must pass.

The second tier—perhaps even more important than the first—involves the process by which Chinese end users search for, adopt, and then implement, new knowledge. It is these consumers who make many of the most important decisions about technology transfer, and it is in this second tier that we find much of the driving force for technology acquisition.[7]

Chinese enterprises—large state organizations and smaller collective enterprises, technical institutes, and organizations of the distribution system—sit at the nexus of a complex series of information flows and product chains. Take, for example, the recent purchase by a Hospital Association in southern China of CAT scanners. The association, made up of thirteen health delivery organizations, came together specifically to pool their resources for new equipment. For two years, members of this consortium examined brochures, traveled to trade shows, and solicited bids from foreign firms such as Matsushita, Hewlett-Packard, and General Electric.

The Association Board was attracted to equipment from each of these firms. But how to decide what sort of technology was needed and from whom it should be purchased? A number of outside agencies were involved in the discussion of these topics. Several municipal health agencies were concerned about the kinds of equipment that might be purchased, the training that would be required to run the machinery, and public access to the facilities. Provincial authorities came into the discussion when delivery schedules and financing were debated. And offices in Beijing were notified about the contacts with foreign firms.

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[6] The role of the enterprise on the "supply side" is an equally fascinating story that I have written about elsewhere. It turns out that most of the technology transfers to China—commodities, turnkey projects, scientific processes—have come from corporations, not governments. Especially interesting is the wide variety of factors that shape an American or Japanese firm's decision to transfer a given sort of technology, even within the same industry; the structure of the firm itself, its financial and technological underpinnings, the nature of its organizational and decision-making process, and the pattern of its planning and implementation procedures.

See Roy F. Grow, "Japanese and American Firms in China: Lessons of a New Market," in *Columbia Journal of World Business* (Spring, 1986). See also, Roy F. Crow, *American Firms and the Transfer of Technology to China: How Business People View the Process* (Office of Technology Assessment, Contract No. 633–51550 February, 1987); and Roy F. Grow, "Managing Entry into a New Market: Japanese and American Strategies in China."

[7] Some case-study examples are in Roy F. Grow, "Acquiring Foreign Technology: What Makes the Transfer Process Work?" in Denis Simon and Merle Goldman (eds.) *Science and Technology in Post-Mao China* (Cambridge: Harvard University Press, 1989) Chapt. 13.

Ultimately, the final decision was made by the Association Board, and not by "higher level" authorities. This board weighed the financial and technical information, ranked factors such as reliability and adaptability, and meshed the needs of all thirteen members into a workable proposal. While *approval* of the project had to be discussed with several different agencies, the decision about the *type* of equipment—Matsushita, Hewlett-Packard, or General Electric—was made by the end users themselves.

A similar process occurred when a parts plant in Shenyang needed new die casting technologies.[8] When two foreign firms—one from the United States and the other from Japan—presented proposals for upgrading the factory's heating furnace, the factory head, Manager Xiu, found himself at the center of an intricate negotiation process that included groups both inside and outside the factory. Within the factory, Manager Xiu participated in a series of discussions with workers, engineers, and union heads about the benefits and impact of the new technologies. Outside the factory, he negotiated with upstream suppliers of steel and energy, and downstream purchasers of the factory's output. All were concerned about such things as downtime, quality, and the need for new resources. Manager Xiu also consulted with Beijing ministries such as the Ministry of Metallurgical Industries and the China National Auto Industry Corporation, as well as with his own provincial light industrial bureaus. For the new heating furnace technologies to come to China, all of the groups had to be consulted and most, finally, had to "sign on" to the project.

My examination of several hundred technology transfer projects leads me to believe that Chinese enterprises *that succeed* in acquiring new technologies almost always pass through a process of decision and acquisition consisting of a series of stages. These stages include the following:

Defining the problem. The decision to search for new technologies almost always begins with the definition of a problem—the realization that some piece of equipment or some work-process is not performing adequately or that another enterprise has learned how to do something more effectively. In most cases where foreign technologies are successfully transferred, the problem is first defined by those most immediately involved—the management of the enterprise responsible for the good or service in question.

Searching for solutions. Once the members of an enterprise decide to search for a solution to a problem, there are several sources of support, guidance, and information available to them. The three groups now used most commonly by enterprise managers are administrators in local bureaucracies and agencies who already have familiarity with the unit, managers in other production units who have dealt previously with the enterprise, and patrons in municipal and provincial organizations.

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[8] Details are in Roy F. Grow, "How Factories Choose Technology," in *China Business Review* (May–June 1987), pp. 35–39.

Weighing the options. In the *successful* technology transfer projects I have examined, the decisions about *specific* foreign technologies are most often made by the actual end users—the managers, chief engineers, and production specialists who will actually use the new methods. The most sensitive discussions usually occur *within* the Chinese enterprise after the first contacts with a foreign firm have been made. In a series of meetings and seminars, the details of the different possibilities will be made known to various groups who will then voice their concerns. These discussions, wide-ranging at first, will gradually focus on a series of positive and negative consequences that might result from the employment of new technologies. Will job assignments change? Will new skills be required? Will salaries be frozen while the equipment is paid for? Does the technical staff believe that the "mesh" of new and old technologies is acceptable?

The discussions with groups *outside* the enterprise are more complicated. Most enterprises have a web of relationships with upstream suppliers and downstream consumers. Will the new technologies require new inputs such as energy, materials or transportation? Will the new technologies affect products already purchased by other enterprises? How much downtime will be required to install the new equipment? Will prices go up?

Finally, an enterprise almost always consults with a series of local agencies about the impact of the new technologies. Will air and water pollution increase? What will be the new output levels, and what will be the marginal tax rates on this production? Are new workers required? Will there be new work rules? Each of these factors will be discussed—each with a different county, municipal, or provincial agency.

Negotiating the terms. There are several ways to proceed once foreign firms have expressed an interest in a project. "Higher authorities" at the provincial and national levels can handle all of the discussions for an enterprise; a professional negotiating team can be called in to represent all of the players; or the enterprise can handle the negotiation itself.

Negotiations with foreign firms about technology transfers are accompanied by a substantial amount of "baggage," involving more than price, delivery schedules, and mesh. In reality, a Chinese enterprise brings to the negotiation a large number of concerns from all of the different constituencies. Meshing all of these concerns can be delicate and time-consuming work.[9]

Ratifying the decision. Obtaining official imprimatur so that a project may be set in motion is a difficult procedure for outsiders to comprehend. Understanding it means distinguishing between the substantive decisions that have practical consequences and the administrative decisions that result in final approval.

All Chinese enterprises looking for foreign technologies have some sort of relationship to local, provincial, and national agencies and bureaucracies. Some of these agencies are influential and can have a life or death impact on the proposal under consideration. others are little more than one-room offices with a few file cabinets.

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[9] Roy F. Grow, "Changing the Rules: Debating Price and Contract Regulations in the Northeast," (July, 1988).

In none of the projects I studied has *one* agency controlled *all* aspects of an enterprise's life. Most often the situation is one in which a number of agencies and organs have a limited influence over some aspect of an enterprise's activities.

In most successful technology transfer projects, it is the actual Chinese end users of the new technologies that determine how well these technologies are accepted. This is not to say that the end user acts alone. Many individuals, offices, and agencies are involved in every stage of the process. But outside involvement comes into play most often during the *ratification* of the choice of a new technology that has been selected by the end user.[10]

III. WHAT MAKES FOR A SUCCESSFUL ENTERPRISE?

Some enterprises are clearly more successful at moving through the different parts of the technology acquisition process than others. Within the same industrial sector, and even among a group of enterprises that are clustered under the same ministerial "umbrella," some enterprises move rapidly and forcefully to acquire foreign technologies while others are more reticent and passive.

In the changing Chinese economic climate of the 1980s, there are certain elements that play an increasingly important role in the pace at which a Chinese enterprise moves through the technology acquisition process. Among the most important in determining the success or failure of the technology transfer process are:[11]

Enterprise size. Bigness, increasingly, gets in the way of technology acquisition. The sheer magnitude of the changes required in large-scale industrial technology transfer projects, for example, brings large state and party entities into play when decisions about change are required. Discussions often become bogged down under the sheer weight of all of the groups that have to be consulted.

In large state enterprises in general, and in many "special" large projects in particular, there is a greater tendency for a "blocking coalition" (to use Mancur Olson's phrase) to act in ways that will, finally, thwart the changes a new technology entails.[12] In the new China, where central allocation is becoming less a fact of life, smaller units now have a better chance of escaping the inertia that often results when large, worried, and contentious groups are threatened with change.

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[10] See Roy F. Grow, "A Pharmaceutical Deal: How an American Company and a Chinese enterprise adapted to the Changes in China's Pharmaceutical Industry," *China Business Review*, Nov-Dec. 1987, pp. 40–43.

[11] Ultimately, I believe, there must be a set of reciprocal qualities present in both the technology-granting foreign firm and the technology-acquiring Chinese enterprise for the transfer process to work: Particular kinds of foreign firms work best with particular kinds of Chinese enterprise. See Roy F. Grow, *Assessing the Fit Between Foreign Firms and Chinese Enterprises: Comparing Japanese and American Technology Transfers to China* (Second Annual IBEAR Research Conference, USC, April 7, 1988).

I am especially indebted to Bill Fischer and Denis Simon who have helped me think through the problems associated with investigating and demonstrating this reciprocal relationship.

[12] Mancur Olson, "Supply-Side Economics, Industrial Policy, and Rational Ignorance" in Barfield and Schambra (eds.), *The Politics of Industrial Policy*, (Washington, D.C., American Enterprise Institute, 1986) pp. 245–269.

Enterprise autonomy. In the past, having a patron in high places paid off for many industrial enterprises. A patron could look out for an enterprise's interests, nudge the allocation process in the right direction, and push for bureaucratic approval. A patron could also steer technology acquisition projects through all of the important parts of the bureaucratic system.

But nowadays, enterprises that have not tied their carts too closely to one Beijing or provincial horse appear to fare better. Autonomy allows flexibility—the ability to maneuver one's way through the bureaucratic maze when one avenue is blocked.

Enterprise organization. The way that the enterprise itself is put together often influences its ability to acquire foreign technologies. Those firms that most successfully navigate the technology transfer process have some of the following characteristics:

- *They lack deep and immutable divisions.* The scars of the 1960s and 1970s run deep in many enterprises. In many units the "political" and "technical" groups that were antagonistic toward one another in the past now see one another daily in their factory work settings. Technical people—scientists, engineers, accountants—remember their ostracism and expulsion; political people now chafe at the sudden turnaround in their own fortunes and their seeming lack of opportunity for advancement. In enterprises where this bitterness remains deep, the ability to affect the changes required by new technologies is often blocked.
- *They have arenas for discussion.* Fear and tension can run through a work force when new technologies require change in an enterprise. Whose job assignments will be changed? Whose skills will be rendered obsolete? Whose avenue to advancement threatened? Enterprises that move through technology acquisition successfully often develop mechanisms for alleviating these fears. Most of these mechanisms are of the variety well-known to western factory managers: group meetings, retreats, after-hours get-togethers. The importance of these mechanisms is the opportunity they afford for assurances that the fears and tensions associated with change will be taken seriously, and that inputs from the enterprise personnel will be heard.

Enterprise management. The role of the enterprise manager is complex. The best managers try to deal with active and competing needs and desires both within their units and those outside groups whose cooperation is necessary to the unit's work.

Chinese managers who successfully move through the steps of foreign technology acquisition usually demonstrate some combination of the following abilities:

- *They recognize the advantages of change.* The impetus for change in a Chinese unit most frequently originates with some sort of unexpected crisis in the enterprise—the failure of a machine, a new demand for a different sort of production, a serious financial situation, the return from abroad of an employee or local official full of new ideas. Managers successfully acquiring foreign technologies know how to turn necessity to advantage and seize the opportunity when changes are forced on them.

- *They build good relationships with technical subordinates.* While the manager is usually responsible for overall coordination of a project, many Chinese enterprises put a chief engineer in charge of technical decisions. A key variable in the success of foreign technology acquisition projects is the nature of the relationship between the general manager and his chief engineer(s). When managerial and technical perspectives do not mesh, the possibilities of conflict are magnified, and discussion within the enterprise can become fragmented and lack focus. When the manager works easily with technical personnel, the acquisition process proceeds more smoothly, regardless of the "fit" of the new technology.
- *They are sensitive to the needs of major constituencies.* Most Chinese managers seeking to acquire foreign technologies do not exist in a vacuum: upstream suppliers and downstream purchasers are also affected by technological changes. Managers that move most easily through the acquisition and implementation process work closely with all of their constituencies, involving them early on in many of the discussions and negotiations.
- *They maintain multiple lines of communication.* Lines of authority and control have changed dramatically since the late 1970s. As the process of central planning and allocation gives way to a more diffuse system of operation, Chinese enterprise managers face a more fluid decision making process. The most successful managers have a multiplicity of contacts on the local, provincial, and even national levels. Many have built lines of communication with individuals and agencies that in the past would have been out of bounds to them because such lines would have crossed bureaucratic jurisdictional lines.
- *They are entrepreneurial.* Along with the increase in the points of access (both for and to the manager), comes a correspondingly greater amount of time spent looking for a path through the Chinese bureaucratic "maze." Success for managers nowadays necessarily involves the ability to maneuver between and among the different government bureaucracies. Chinese managers who are most effective in acquiring foreign technologies are entrepreneurial types who play multiple points of access and control off against one another and take a certain joy in the process.

IV. CHINESE ENTERPRISES IN THE 1990S

The role of the entrepreneur, noted J. B. Say at the end of the 18th century, is to shift resources from less productive to more productive tasks. The Chinese reforms of the 1980s not only set in motion an energetic drive for new technologies, they also empowered enterprises and their managers to move in new ways—to direct their own and their enterprise's resources more effectively and to use their own creative energies to make the technology acquisition process work.

Will the new role for the enterprise and its managers continue? It is a commonplace in political analysis everywhere to note that public policy is shaped by the interaction of competing forces, and that the fate of a given policy can be quickly turned around by what appears at the time to be a relatively insignificant event or issue.

Now there are several clusters of issues that could affect the Chinese enterprises' role in the technology acquisition process. Some of the most important include the following:

Strains of an inadequate infrastructure. In the mid-1980s almost every analyst—Chinese and foreign alike—argued that important changes in infrastructure would be required if Chinese enterprises were to manage technology acquisition effectively. Some changes were begun: new contract systems, bankruptcy laws, financial institutions, and accounting procedures all came into being.

In 1989 Chinese managers involved in technology acquisition projects argued that these innovations helped them in their projects. Not every manager in every enterprise was affected in a similar manner. But, taken together, most managers argue, the changes (real or promised) in infrastructure created an atmosphere in which innovation became possible and entrepreneurial daring held out the promise of reward.

But many of the Chinese enterprise managers who began to acquire and implement foreign technologies in the mid-1980s now believe that the most important infrastructural changes are still to come. These Chinese managers argue that they still need legislation and support in key areas such as rules governing party personnel in the enterprise, inspection systems for maintaining quality control, guidelines for changing work assignments, and procedures for resolving work grievances.

The continuing lack of managerial skills. Many Chinese enterprises that acquire foreign technologies are very well managed. In these enterprises, there is a depth in important skills, especially of specialized technical expertise areas and of knowledge of interpersonal relations.

But many other skills are in short supply. From the perspective of technology *acquisition,* the most notable need is for negotiation skills that can be used to build relationships *between* Chinese enterprises. When managers do not possess these negotiation skills, the price is inertia: Managers might see a need in their enterprise and find a technology; but they do not know how to handle all of the changing relationships with upstream and downstream constituencies required by the demands of the new technologies.[13]

Negotiating with representatives from foreign firms is an equally difficult skill for Chinese managers to acquire. Most Chinese managers have developed antennae that are reasonably sensitive to the cross-cultural dimension of the negotiation process: They expect a certain "monarchical bearing" on the part of Japanese business people, and they are used to the culinary pickiness of Americans.

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[13] The most insightful and sensitive work is that of William Fischer. See, for example, his "The Transfer of Managerial Knowledge to China" (Office of Technology Assessment, Contract No. 633-1670.0).

More difficult for Chinese managers is understanding the foreign *context* of their foreign guests' negotiation position. Most Chinese managers have very little understanding about how an American firm operates or how such a firm differs from its Japanese counterpart. Many Chinese negotiation teams miss the subtle nuance in the bargaining process and have real difficulty analyzing the needs of the foreign side.

The unexpected impact of world overcapacity. Most Chinese enterprise managers and officials still have not come to grips with the unexpected appearance of manufacturing and agricultural production overcapacity in the outside world. This "glut" has mixed implications for many Chinese enterprises. On the one hand, the availability of technologies—factories, equipment, expertise—at increasingly lower prices makes possible some good buys for the right Chinese enterprise. On the other hand, Chinese enterprise projects tied to exports will face some very rough times in the years ahead, especially in those sectors where Chinese standards are not yet up to world-class levels.

The arrogance of foreign firms. Many foreign firms—Japanese, American, and European—are involved in the China market in very successful ways: They are participating in solid ventures with Chinese partners, are transferring important knowledge, and are attaining satisfying levels of return. Almost without exception, executives in these foreign firms reconfirm the age-old "when in Rome" lessons of international business: success in China is highly dependent on learning the ways of the host market.

For successful foreign firms, the lessons of the China market are tough but not impossible. They include the need (a) to understand the relationship between the Chinese decision and ratification processes, (b) to recognize the importance of discovering linkages between the enterprise and local and national bureaucracies, (c) to think of the factory manager in terms of his relationship to upstream and downstream constituencies, and (d) to approach Chinese end users in terms of a solution to some troubling problem identified by the end users themselves.

Sadly, many foreign firms have not yet learned these lessons. Instead, they see the China market as irrational, protected, and backward, and think of exploiting it through "quick hits." Many of the foreign firms in this category look past their potential customers' real needs, and look instead at what it, the foreign firm, wants to sell. The results are often unfortunate: Chinese purchasers with equipment that is simply irrelevant to their needs, products that cannot be maintained in the Chinese environment, and promises about performance that cannot be fulfilled.

Every misrepresentation and broken commitment builds warier Chinese enterprise managers and agency officials. The more Chinese managers and officials who are stung by foreign firms, the greater will be the pressure to move away from the promises of the New Open Door.

V. Prospects for the Future

The Chinese enterprise exists in a rapidly changing world: In the late 1980s managerial reforms continued to alter the formal relationship of the enterprise to provincial and national bureaucracies; new sources of funding are still reshaping the basis of formal authority; new rules in the ministerial accounting system are helping enterprises avoid some of the most entangling forms of middle-level bureaucratic control; new bankruptcy laws are challenging fundamental concepts about the relationship of surplus value to the life of a production organization; and the recent banking and accounting regulations are influencing the enterprise's ability to manage retained earnings.

Not every enterprise can adjust to all of these changes. In many cases, resistance to the changes is springing up—both from those in enterprises who find the new demands too great, and from those in state agencies who worry about the increasingly important role that enterprises are playing.

Many Chinese enterprises that seek to acquire new foreign technologies thus find themselves caught between the dynamics of a rapidly changing administrative system and countervailing forces that are pushing for different ways of bringing new technologies to China.

An important part of China's ongoing effort to acquire and assimilate new technologies must be directed at the *primary* agents of change—the Chinese enterprises that will actually use these technologies and the people in the enterprises who will make the technologies work.

CHINESE LAW RELATING TO FOREIGN INVESTMENT AND TRADE: THE DECADE OF REFORM IN RETROSPECT

By James V. Feinerman *

CONTENTS

Page
I. Direct Foreign Investment 829
II. Legal Concerns of Foreign Investors 831
  Disparate Tax Treatment 832
  Sales on the Domestic Market 832
  Foreign Exchange 833
  Control 834
  Approval 834
  Labor 834
  Contractual Obligations 836
  Dispute Resolution 836
III. Recent Legal Reforms In Response to Foreign Concerns 837
IV. The Regulatory Regime for Foreign Trade 838
V. Conclusion 840

During the eleven years which have passed since China's historic announcement of its Joint Venture Law (JVL),[1] foreign investors have become very familiar with the existence and the elements of the legal framework for foreign investment in China. At the same time, more than a decade of experience of major foreign corporations in the China market, and the publicity attendant to the serious problems which have arisen from some of this investment and trade, has somewhat lessened the enthusiasm of the international business community to enter and to remain in China.[2] This discussion will focus on the extent to which the emerging legal system of the People's Republic of China (PRC) has succeeded in addressing these difficulties and, where relief has not been forthcoming, on the features of China's laws which are still not conducive to foreign

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[1] Law of the People's Republic of China on Joint Equity Enterprises (adopted July 1, 1979; amended Apr. 4, 1990). The Chinese text and an English translation appear in 1 China Laws for Foreign Business, para. 6-500 at 7,801 (CCH Australia Ltd. ed. 1985).

[2] *See e.g.*, Burns, "Why Investors Are Sour on China," N.Y. *Times*, June 8, 1986, at C7, col. 1; Burns, "A.M.C.'s Troubles in China," N.Y. *Times*, April 11, 1986, at D4, col. 1; Schiffman, "AMC Jeep Venture Trying to Get Back on Track After Peking Helps to Ease Currency Squeeze," Asian Wall St. J. Weekly, Aug. 25, 1986, at 4. *See also* Browning, *If Everybody Bought One Shoe* (N.Y.: Farrar, Straus & Giroux 1989). Interestingly, most of the negative features were publicized well before the Beijing Massacre of 1989.

investment and trade. Due to the extensive legislative activity of recent years, this treatment will necessarily be selective.[3]

I. DIRECT FOREIGN INVESTMENT

Although a large number of possibilities for investing in China have materialized in recent years, including such sophisticated mechanisms as bank lending, leasing, technology licensing, and compensation trade, the method most publicized by Chinese government authorities has remained direct foreign investment. The chief focus of national and regional legislation, direct foreign investment has grown continuously since the enactment of the JVL until the events of 1989 forced investors to reconsider their China strategies.[4] A combination of primary legislation, secondary implementing regulations and—perhaps most importantly—the precedent of previous foreign investment encouraged such growth. Since the 1979 passage of the JVL, which created the single investment vehicle of a Sino-foreign equity joint venture with the parties owning shares of a newly-created company, additional investment opportunities with different legal features have been developed, including wholly foreign-owned enterprises[5] (WFOE) and cooperative (contractual) joint ventures[6] (CJV) which afford greater flexibility than the equity joint venture (EJV).

Since the Third Plenum of the Eleventh Communist Party Congress in late 1978, China has embarked on an ambitious program of political and economic reform. One of the major elements of this program has been an opening to the outside world, sometimes referred to as China's "Open-Door" or, more simply, "open" policy. In that vein, China promulgated the JVL in July, 1979, to encourage foreign participation in China's modernization program. In furtherance of this program, regulations appeared in 1980 which allowed foreign companies to set up representative offices in China.[7] These provisions represented an extraordinary break with both the rhetoric and the practices of the thirty years immediately following the establishment of the PRC, when China condemned foreign investment in the developing world as exploitation and eliminated all but a few remnants of pre-1949 foreign business in China. The final confirmation of this change was the adoption of an unusual provision in the fourth PRC Constitution, promulgated in 1982, which reinforced previous legal developments by promising to protect "the lawful rights and interests of foreign investors." [8]

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[3] A recent search of a legal database containing only the most basic Chinese legislation which has been translated into English reveals 216 sets of laws and regulations related to foreign investment and trade. Westlaw, *Chinalaw* Database (West 1990).

[4] Brecher, "The End of Investment's Wonder Years," *The China Business Review*, January-February 1990, at 27-29.

[5] The Law of the People's Republic of China Concerning Enterprises with Sole Foreign Investment (adopted Apr. 11, 1986). The Chinese text and an English translation appear in 1 China Laws for Foreign Business, para. 13-506 at 16,651 (CCH Australia Ltd. ed. 1985).

[6] The Law of the People's Republic of China on Sino-foreign Co-operative Enterprises, (adopted Apr. 13, 1988). The Chinese text and an English translation appear at 1 Chinese Laws for Foreign Business, para. 6-100 at 7,551 (CCH Australia Ltd. ed. 1985).

[7] Interim Regulations of the People's Republic of China Concerning the Control of Resident Offices of Foreign Enterprises (promulgated October 30, 1980). The Chinese text and an English translation appear at 1 Chinese Laws for Foreign Business, para. 7-500, at 9,051 (CCH Australia Ltd. ed. 1985).

Over the next several years, a surprisingly large body of law was published to implement this policy of encouraging foreign investment. Tax rules, foreign exchange controls, customs regulations and even trademark and patent laws were announced. Implementing regulations to explain and to expand the provisions of the basic laws also appeared, but often only after a considerable period of confusion and uncertainty. For instance, the implementing regulations for the original JVL were promulgated four years after the basic law; [9] WFOE existed for almost three years before they were legally recognized.[10] China asked foreign investors for patience as it accustomed itself to the new rule of law it was promoting in the foreign economic arena, but foreign businesses remained understandably somewhat reluctant to put large sums of money at risk in China without knowing what legal rules would be in force there.

A separate, and generally more favorable legal regime, was created in a number of special economic zones (SEZs) located in the southeastern coastal provinces of Guangdong and Fujian.[11] These SEZs offer lower taxation rates, special customs treatment for the import of raw materials needed in production and for the export of finished goods as well as simplified procedures for establishing 100%-foreign owned enterprises therein. The vast majority of SEZ ventures have been established in the Shenzhen SEZ, just across the border from Hong Kong. An increasing number of ventures have recently begun to appear in the Xiamen SEZ, the special zone closest to Taiwan. Most of the SEZ ventures have been small-scale, low-technology assembly operations attracted by cheaper land and labor costs. Before the recent downturn in the hotel industry, Shenzhen attracted several large hotel projects.

Of the three major forms of direct foreign investment—EJVs, CJVs and WFOEs—the most legislative attention has been paid to the equity joint ventures. For the first several years of their existence, however, foreign business did not seem particularly eager to establish them in China. In part, this hesitation was due to the failure previously mentioned to enact implementing regulations, but flaws in the basic legal form may have also contributed to their lack of attractiveness. Under the original legislation, joint ventures were supposed to be formed as "limited liability companies with the status of Chinese legal persons." [12] Yet, as of this writing, the

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[8] The Constitution of the People's Republic of China, art. 18 (adopted Dec. 4, 1982). The article also states that foreign enterprises, other foreign economic organizations and individual foreigners are permitted to invest and to enter into economic co-operation with Chinese enterprises and economic organizations. (Peking: Foreign Languages Press 1983).

[9] Regulations for the Implementation of the Law of the People's Republic of China on Joint Ventures Using Chinese and Foreign Investment (adopted Sept. 20, 1983). The Chinese text and an English translation appear in 1 China Laws for Foreign Business, para. 6-550, at (CCH Australia Ltd. ed. 1985).

[10] *See* Stein, "Wholly Foreign Owned Ventures in China: A Comparison of 3M China Ltd, Grace China Ltd and the New Foreign Enterprise Law," 4 China Law Reporter 1 (1987). An English translation of the "Law of People's Republic of China on Enterprises Operated Exclusively with Foreign Capital," appears in Foreign Broadcast Information Service (FBIS) *Daily Report: China*, 14 April 1986 at K13-K15; *reprinted in* 4 China Law Reporter 63 (1987).

[11] *See* Pow and Moser, "Law and Investment in China's Special Investment Areas," in Moser, ed., *Foreign Trade, Investment, and the Law in the People's Republic of China* (Hong Kong: Oxford University Press 2d ed. 1987).

[12] Law of the People's Republic of China on Sino-foreign Joint Equity Enterprises, *supra* note 1, art. 4:A joint venture shall take the form of a limited liability company.

PRC has never adopted a Company Law and, until 1987, did not even have in force a basic Civil Code. As a result, no one knew what the description "limited liability company" or even "legal person" meant under Chinese law.[13] Under the provisions of the original JVL, the management structure required the president to be a PRC national, unanimous board of directors approval for major corporate acts and fixed-term duration of the joint venture. Many foreign investors found the JVL too restrictive, despite the certainty which Chinese government approval lent to this form of foreign investment.

Far more foreign investment in and trade with China has occurred by means of the so-called "contractual" joint venture or CJV. These enterprises also involve joint investments of cash, other property and contributions of technology by foreign and Chinese parties; however, they enjoy greater flexibility. No new, separate legal person is created automatically, and fewer legal restrictions govern the relationship between the co-venturers. Tax rates, under the Foreign Enterprise Income Taxation Law, are higher than for joint ventures, but this has not deterred foreign investors from preferring the contractual form. In contrast to the requirements of the EJV, the sharing of profits is established by the parties' contract rather than on the basis of their respective equity interests.[14]

The WFOE originated in the SEZs, which were the first localities to permit foreigners to establish wholly-foreign-owned enterprises within their boundaries. A United States corporation, Minnesota Mining & Manufacturing (3M) received the first permission to set up a WFOE outside the SEZs, in Shanghai, in 1983. 3M insisted to the Chinese that all of its overseas operations have been conducted on the basis of 100% ownership; China was also very eager for 3M's expertise in adhesives technology.[15] By passing a law formally recognizing WFOEs, China acknowledged officially its previous unofficial policy of permitting entirely foreign-owned enterprises to operate in China. They are also considered to be "legal persons," but—unlike the JVL—no provision in this legislation expressly limits such enterprises' liability. Various restrictions—for example, on the lines of business in which WFOEs may engage—remained to be detailed in subsequent implementing regulations.

II. LEGAL CONCERNS OF FOREIGN INVESTORS

A number of legal issues have become problems common to all these different types of enterprises, regardless of their form. Chinese authorities began to address some of these concerns in the mid-1980s,[16] but it remains to be seen just how far they will be willing to go to accommodate foreign investors' demands. On the other hand, several high-ranking Chinese officials have indicated that domestic political uncertainty in the aftermath of the events of the spring and summer of 1989 have in no way dampened the PRC's determination to encourage foreign investment.[17] A look at a few of the continuing problems, and recent attempts to remedy some of them with new legislation, may prove instructive.

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[13] Since January 1, 1987, the General Principles of Civil Law have been in force. "Legal persons" are defined in art. 36; civil liability is described in Chapter 6, arts. 106-141. *See* Jones, ed., *Basic Principles of Civil Law in China* (Armonk: M.E. Sharpe 1989).

[14] Some of this flexibility was eliminated with the enactment of the law authorizing CJVs, *supra* note 6, but the basic distinctions persist. *See* Tao, "New Chinese Law on Cooperative Joint Ventures I—Preliminary Analysis," *International Business Lawyer*, January 1989, at 7.

A number of foreign advisors to international investors have found this law problematic. They complain that local authorities have applied the law rigidly, refusing to allow non-legal-person ventures to be established; that provisions for return of capital to foreign parties are unfortunately vague; and that the imposition of a strict legal form will adversely affect the success that CJVs have heretofore enjoyed. *See* Salbaing and Nee, "New Chinese Law on Cooperative Joint Ventures II—An Editorial Comment," *International Business Lawyer*, January 1989, at 10.

[15] *See* Stein, *supra* note 10.

DISPARATE TAX TREATMENT

Since the early 1980s, it has become difficult to keep count of the number of differing regimes of taxation which have been adopted in China.[18] In addition to China's domestic tax regime, which affects any Chinese legal person, there are now multiple sets of laws for foreigners—EJV taxes, Foreign Enterprise Income Tax, SEZ taxes and a different scheme of reduced taxes for non-SEZ "Economic and Technical Development Zones" in fourteen coastal cities.[19] Each tax regime provides different rates and disparate treatment of such matters as tax holidays, reductions and exemptions for specified businesses and reinvestment, not to mention withholding taxes. As a result, calculating which tax provisions provide any single enterprise or investment possibility the most favorable treatment has become a considerable burden, and expense, for foreign investors. The situation has been little improved by the publication of circulars, notices and other documents by the Ministry of Finance and its General Taxation Bureau intended to clarify these laws and their application. A large number of "secret" (*neibu*, or "internal") provisions still exist in this area, further complicating matters and raising investor suspicions that such rules are invoked capriciously.[20] A uniform tax system described in detailed, published regulations, fairly enforced, would do much to increase foreign investor confidence.

SALES ON THE DOMESTIC MARKET

Undoubtedly one of the biggest attractions for foreign investment in China is the potential of China's market of one billion consumers. Despite China's announced intention to use foreign investment to increase Chinese export capabilities, foreign companies have continued to view investment in China as a kind of "down payment" against the future, when they hope to tap the huge pool represented by the Chinese population. In many cases, foreign investors have been encouraged by their Chinese counterparts to believe that they would be able to market their products in China almost as soon as in-country production began, as long as they turned out products "urgently needed" in China or which substituted for imports. In the past few years, however, these plans have run into a number of roadblocks. First of all, government approval must be obtained before new products can enter the market. If joint venture products compete with existing Chinese products, approval may not be granted; in some cases approval has been restricted to certain geographical areas. If the product does not replace one already being imported by Chinese state foreign trade companies, payment will most likely be in Chinese currency, which is not convertible. Pricing may be determined by prices fixed for similar products under the central Chinese State Plan.[21]

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[16] Provisions of the State Council of the People's Republic of China for the Encouragement of Foreign Investment (promulgated Oct. 11, 1986). An English translation appears in *China Daily*, Nov. 4, 1986, at 2.

[17] *See*, *e*. *g*., "Leadership Vacuum, Continuing Interest in JVs Highlighted at NPC," *Business China*, April 9, 1990, at 49.

[18] Two useful resources which provide background information, an overview of taxation and some guidance as to the application of the laws are Moser and Zee, *China Tax Guide* (Oxford: Oxford University Press 1987) and Easson and Li, *Taxation of Foreign Investment in the People's Republic of China* (Deventer: Kluwer Law and Taxation Publishers 1989).

[19] *See* Pow and Moser, *supra* note 11, particularly, "II. The Fourteen Coastal Cities," at 233–247.

[20] *See*, *e*. *g*., Capener, "An American in Beijing: Perspectives on the Rule of Law in China," 1988 Brigham Young University Law Review 567, at 587.

FOREIGN EXCHANGE

Although Article 75 of the Regulations for the Implementation of the Law of the People's Republic of China on Joint Ventures Using Chinese and Foreign Investment held out the promise that foreign exchange deficiencies experienced by joint ventures selling on the domestic market (presuming such sales were approved) would be remedied by the Chinese government, experience has proven otherwise.[22] In most cases, the Chinese government has simply suggested that the foreign party to the venture defer distribution of its "profits" until the foreign exchange problem can be solved. Of course, such profits can be reinvested inside China, but there are limits on the availability of attractive possibilities.

The prospects for achieving some accommodation of foreign investor concerns with respect to foreign exchange are not good in the short term. The events of the spring and summer of 1989 aggravated an already grim fiscal situation, which encompassed China's worst deficit in ten years, peaking repayment levels on foreign debt and greatly lessened availability of official and private financing from foreign sources.[23] Attempts to remedy previous foreign exchange problems, such as the State Council Regulations Concerning the Balance of Foreign Exchange Income and Expenditure by Sino-Foreign Joint Equity Ventures, have failed to end the chronic imbalances that have plagued foreign enterprises.[24]

Even the creation of local swap centers, where foreign enterprises with surpluses of non-convertible Chinese currency could exchange it with enterprises enjoying a foreign currency surplus, have not eliminated foreign exchange complaints. Beginning with the first such center in the Shenzhen SEZ in 1985, it seemed that a national market for foreign exchange might emerge in China, under the control of the State Administration of Exchange Control.

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[21] *See* Zhang, "Improving Conditions for Joint Ventures," *Beijing Review*, Sept. 1, 1986, at 4; Horsley, "Investing in China in 1985," in Theroux, ed., *Legal Aspects of Doing Business with the PRC 1985*, 149–150 (New York: Practicing Law Institute 1985).

[22] Article 75 provides: [T]he unbalance [of foreign exchange] shall be solved by the people's government of a relevant province, an autonomous region or a municipality directly under the central government or the department in charge under the State Council from their own foreign exchange reserves. . . .

[23] Okubo, "Financial Difficulties and Prospects for the Future," *JETRO China Newsletter*, No. 86, at 12 (1990).

[24] Regulations of the State Council Concerning the Balance of Foreign Exchange Income and Expenditure by Sino-Foreign Joint Equity Ventures (promulgated Jan. 15, 1986). The Chinese text and an English translation appear in 1 China Laws for Foreign Business, para. 6–590, at 8,031 (CCH Australia Ltd. ed. 1985).

Yet, clear guidelines for the system were never issued, and full participation remained limited to certain Chinese enterprises and some foreign investors.[25] Most importantly, the general availability of foreign exchange has been subject to wide variation related to central government's management of foreign exchange. The underlying policy, and many of the relevant legal regulations, are unknown, and perhaps unknowable, to foreign investors.[26]

CONTROL

Although it should be theoretically possible for a foreign investor to achieve control over a venture in the PRC by using investment ratios to determine majority voting rights, there has seemed in fact to be little freedom for foreigners to take active control of any Chinese investment. In equity joint ventures, all significant decisions require unanimity. Even the other investment vehicles, which appear to afford greater control, remain subject to a number of restrictions in reality. Hiring labor, marketing product, maintaining access to necessary inputs such as water, electricity or transport all require cooperation from Chinese entities, whether they are venture partners or not. To preserve harmonious relations, a foreign investor will have to consider the wishes of Chinese counterparts, regardless of the nature of legal relationship.

APPROVAL

The approval process in China is maddening not only for foreign investors; domestic enterprises also suffer from what is euphemistically called "bureaucratism." Central government attempts to delegate approval power to lower level authorities have had little effect on the underlying problem. Worst of all, whenever the central government fears even a temporary loss of control over some aspect of China's economy or society, its first impulse is to re-centralize its control over the localities. The domestic austerity program underway since 1988 and the response to political unrest in 1989 once again demonstrated these tendencies.[27] From the preparation of feasibility studies to the granting of final approval, a joint venture proposal or other investment project may languish for several years. A coal-mining joint venture initiated by Occidental Petroleum, finalized in the mid-1980s required six years to gain its approval, and it had the backing of the highest levels of the Chinese state leadership!

LABOR

Although several reforms have been enacted in the administration of China's domestic economy to make workers more efficient and to tie their compensation to their output, many Chinese workers still have the traditional "iron rice bowl" mentality about their work.[28] As a result of this mentality, those who manage Chinese labor—both Chinese and foreign managers—have found it very difficult to discipline workers. Enterprise control of labor has, at least since the Cultural Revolution, been extremely lax. Moreover, recruitment of Chinese workers by foreign enterprises has been tightly controlled by Chinese state agencies. Most significantly, the higher salaries which foreign partners must pay to joint venture workers are not passed through to the workers but are retained by the Chinese venture partners to compensate for "subsidies" for housing, fuel costs, education, medical care and other social welfare benefits normally provided to their employees by Chinese enterprises.

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[25] *See* Yowell, "Swap Center System to Expand," *The China Business Review*, September-October 1988, at 10.

[26] Young, "Foreign Exchange Control of Financial Institutions," *East Asian Executive Reports*, February 1988, at 7-13.

[27] *See*, *e*. *g*., Frisbie and Brecher, "What to Watch For: A Guide to China's Current Business Environment," *The China Business Review*, September-October 1989, at 10-11.

Although the introduction of modern management practices was supposed to have been one of the benefits which foreign investors were meant to introduce into China, it has become clear that, insofar as these involve rewarding diligent and punishing slack workers, there are limits as to what Chinese partners will allow. Despite labor regulations in the SEZs which permit discharge of unsatisfactory workers as a sanction,[29] it seems in practice virtually as impossible to discharge a worker in an SEZ enterprise as it is elsewhere in China. Layoffs have occurred, for example, in Hitachi's joint venture in Fujian province, where 100 workers were determined to be "excess"; the venture was even allowed to fine a few workers who were negligent or insubordinate.[30] Nevertheless, without corresponding reform of employment practices in the Chinese domestic economy, foreign enterprises will continue to find it difficult to enforce a significantly "harsher" regime all by themselves.[31]

A final point of concern in this area for foreign investors has been the extensive rights and powers granted to joint venture trade unions, very little of which seems as of yet to have been exercised. In theory, however, trade union representatives can attend board meetings. Demands of labor, voiced through these organizations, with respect to issues such as wages, welfare benefits and labor discipline are supposed to be "heeded" and "cooperated with." The penalties for failing to heed the demands or not cooperating with the labor unions are unspecified.[32] This vagueness may help to ex-

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[28] More information about Chinese labor law and the effects of the economic reforms on its recent development can be found in Josephs, *Labor Law in China: Choice and Responsibility* (Salem, New Hampshire: Butterworths Legal Publishers 1990).

[29] *See*, e . g., Regulations on Labour Management in the Xiamen Special Economic Zone, art. 18: The Special Zone enterprise may, according to the seriousness of each case, give necessary punishment and even dismissal to employees who violate the rules and regulations of the enterprise and cause certain consequences.

The Chinese text and an English translation appear in 1 China Laws for Foreign Business, para. 76–506(18), at 89,377 (CCH Australia Ltd. ed. 1985).

[30] Other joint ventures have developed even more creative methods, such as deductions from the salaries of poor producers. *See* "Parker-Hubei JV, Part 3: How the Venture Handles Power, Personnel Issues," *Business China*, June 20, 1988, at 81.

[31] One attempt to distinguish the rights of foreign enterprises from the generally prevailing regime was the "Eight-Point Decision on Personnel Management of Joint Ventures" issued by the Ministry of Labor and the Ministry of Personnel in 1988, emphasizing the autonomy of "foreign investment enterprises" in hiring and firing Chinese personnel. An English translation appears in *China Economic News*, May 30, 1988, at 2–3.

[32] *See* Regulations of the People's Republic of China on Labour Management in Joint Ventures Using Chinese and Foreign Investment (JV Labor Regulations) and Provisions for the Implementation of the Regulations on Labour Management in Joint Ventures Using Chinese

Continued

plain why Japanese investors have conspicuously shunned joint venture investment in China, given a very different tradition of labor-management relations in Japan.

CONTRACTUAL OBLIGATIONS

As many foreign businesses have learned to their chagrin, Chinese conceptions of contract are a good deal more flexible than those shared by most investors from the developed countries of the industrial world. Several highly publicized contractual disputes, including the cancellation of the contracts for the Baoshan Iron & Steel plant in the early 1980s and the AMC/Jeep joint venture disputes in the mid-1980s, have both discouraged additional investment and led existing investors to doubt the security of deals already made.[33] Whether due to their long experience of living under a planned economy or their bitter memories of unequal bargaining with foreigners before 1949, Chinese negotiators believe that every agreement can be reformulated if the circumstances are exigent enough and that foreign parties' insistence on contract observance is yet another example of foreign economic "imperialism." [34] The idea that one's carefully negotiated business agreement might become a platform for political posturing, or that—as was the case with Baoshan and later with the AMC/Jeep joint venture—high level government officials will have to rescue their nationals' investments by direct intervention is deeply disturbing to foreign investors.[35]

In more optimistic times, it was thought that greater familiarity with international commercial practice, as well as the inculcation of basic notions of contract law through the adoption of a Civil Code and economic contracts laws in China, would alleviate these problems with contracts.[36] Subsequent experience has demonstrated some improvement but indicated that many difficulties will prove persistent. Retrenchment of the domestic economy over the past few years and of foreign investment since June 4, 1989 has raised numerous issues related to the continued validity of contracts concluded earlier; the overall expansion of economic activity has ironically loosened the previous tight control of the central government over all foreign investment.

DISPUTE RESOLUTION

Most disputes involving China's foreign economic relations are resolved through non-judicial methods. Foreign investors are not especially keen to proceed in Chinese courts in any event; their rules of procedure are unclear, and the courts are notoriously sub-

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and Foreign Investment (JV Labor Implementation Provisions). The Chinese text and an English translation of the JV Labor Regulations appear in 1 China Laws for Foreign Business, para. 6-520, at 7,861; the Chinese text and an English translation of the JV Labor Implementation Provisions appear in 1 China Laws for Foreign Business, para. 6-522, at 7,867 (CCH Australia Ltd. ed. 1985).

[33] *See*, *e*. *g*., Sneider, "The Baoshan Debacle: A Study of Sino-Japanese Contract Dispute Settlement," 18 *New York University Journal of International Law and Politics*, No.2, at 541 (1986).

[34] *See* Macneil, "Contract in China: Law, Practice, and Dispute Resolution," 38 *Stanford Law Review*, no. 2, at 303 (1986).

[35] Engholm, *The China Venture: America's Corporate Encounter with the People's Republic of China* (Glenview, IL: Scott, Foresman 1989).

[36] *E*. *g*., Hayden, "The Role of Contract Law in Developing the Chinese Legal Culture," 10 *Hastings International & Comparative Law Review* 571 (1987).

ject to political pressures, particularly from the Communist Party. Informal consultation and discussion between the disputants is encouraged by Chinese tradition and practice.[37] Most contracts involving foreigners also provide for some form of international mediation or arbitration, but these clauses themselves can often present a stumbling block for agreement. In the eyes of Chinese negotiators, third-country arbitration is a last resort; they prefer to stipulate friendly negotiation, conciliation and arbitration to take place in China. Foreign investor suggestions that more impartial bodies determine questions regarding investments in China are alternately condemned as an attack on the integrity of Chinese institutions or as an indication of prior intention to breach agreements. Grudgingly, Chinese negotiators have begun to accept third-country arbitration provisions in foreign investment contracts, but little evidence has yet accumulated in the form of outcomes of disputes arising from these contracts to indicate whether China will abide by the decisions of such bodies. Recent reports that China is itself turning to the courts to resolve its disputes with foreign trading companies offer some hope that formal judicial procedures may enjoy a new respectability.[38]

III. Recent Legal Reforms In Response to Foreign Concerns

On April 4, 1990, the National People's Congress issued amendments to the basic JVL, the most sweeping changes to this foundational law since its promulgation in 1979. In response to concerns voiced by foreign investors over the years and to the worries about China's continued commitment to foreign investment after the 1989 crackdown, these amendments were intended to heighten confidence and to allay fears. A new paragraph was added to Article 2 stating that the state will not nationalize joint ventures; if special circumstances require the requisitioning of a joint venture, appropriate compensation is to be paid according to legal procedures. Article 6 has been amended to permit a foreigner to be the chairman of the board of a joint venture; previously, the chairman had to be Chinese, although the vice-chairman could be foreign. Other amendments have broadened the terms for enjoyment of tax holidays, permitted the opening of foreign exchange accounts in financial institutions other than the Bank of China and relaxed the limits on duration of joint ventures which had previously stipulated a 50-year maximum.[39]

As was the case during previous attempts to attract foreign investment and to respond to criticism of shortcomings in the prevailing regulatory regime, these amendments seem unlikely to improve China's investment climate dramatically.[40] The general reaction of the foreign investor community has been skeptical; these amendments will not really give parties to an EJV significantly greater control over the management of the venture. Many of the provisions merely place the EJV on an equal footing with the other foreign investment enterprises in China, offering the same favorable treatment which CJVs and WFOEs already enjoy.[41] Yet even before the political fallout of the violent suppression of student demonstrators in June, 1989 began to be felt, foreign enthusiasm for investment in China had been waning. Domestic economic belt-tightening, announced in 1988, had adversely affected many joint ventures. Others had long suffered from foreign exchange difficulties, from shortages of raw materials, energy and skilled labor, from arbitrary price controls and restrictions on credit. None of these rather modest adjustments to the JVL addresses these problems. Nor is it likely, given the ambivalence of the top leadership towards foreign investment specifically and the process of economic reform of which it has been part more generally, that fundamental reform of the laws regulating joint ventures will soon occur. Experience at the local level exemplified in regulations formulated recently by the Shanghai Municipal People's Congress parallels that on the national level; some commentators have even argued that these regulations may have created new restrictions on foreign investment and potential sources of interference in the affairs of foreign business enterprises.[42] Despite these adverse reactions, the eagerness of Chinese officials to maintain a certain level of foreign investment should not be underestimated; indeed, the very enactment of new regulations was intended to respond—however unsuccessfully—to foreign investor concerns.

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[37] Robinson & Doumar, " 'It is Better to Enter a Tiger's Mouth Than a Court of Law' or Dispute Resolution Alternatives in U.S.-China Trade," 5 *Dickinson Journal of International Law* 247 (1987).

[38] Song, "All Eyes on Swiss Court in Fraud Case," *China Daily*, Business Weekly, Nov. 20, 1989, at 1.

[39] "PRC Amends Joint Venture Law," 2 *Asian Law & Practice*, No. 3, Apr. 16, 1990 at 35.

[40] *E . g.*, Harding, "The Investment Climate in China," *The Brookings Review*, Spring 1987, at 37 (describing the 22 articles designed to encourage foreign investment issued in October, 1986; Harding concluded that even in the articles were interpreted fairly and implemented effectively, they addressed only a fraction of the problems encountered by the foreign business community).

IV. The Regulatory Regime for Foreign Trade

The general trend over the past decade, at least until the last year, has been to shift responsibility for foreign trade to lower levels and to remove the control exercised by the central government Ministry of Foreign Economic Relations and Trade (MOFERT) and the foreign trade corporations (FTCs) which previously monopolized China's foreign commerce. In place of administrative dictates of quotas and production figures, contractual responsibility negotiated by enterprises, trading companies and lower-level governments were instituted in an attempt to move the PRC towards a more market-oriented foreign trade regimen.[43] Enterprises and other producers of goods for export were supposed to be able to choose among trading companies or, in a few instances, even to bypass the bureaucracy and to trade abroad directly.

The 1988 Draft Plan for Restructuring the Foreign Trade System was designed to give significant power to make decisions to enterprises and new trading companies, as well as provincial and local governments, in exchange for their acceptance of new regulatory oversight of their activities. Thus, direct administrative fiat was intended to yield to indirect guidance through legal controls. As had been the case with earlier attempts at reform in 1980 and 1985, however, the managers of China's foreign trade backed away from radical reform. MOFERT and the FTCs, never reconciled to the loss of their prerogatives, used the inevitable disruptions in trade patterns and the complaints of a few foreign buyers about price gouging and other abuses to clamp down on the proliferation of small local trading companies. Concern about the overheating domestic economy led to further restrictions on the foreign trade activities of factories in the hinterland.

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[41] Robertson & Chen, "New Amendments to China's Equity Joint Venture Law: Changes Unlikely to Stimulate Foreign Investment," *East Asian Executive Reports*, April 1990, at 9.

[42] Gelatt, "New Rules for Investors," *The China Business Review*, March-April 1990, at 30.

[43] *See* Ross, "Changing the Foreign Trade System," *The China Business Review*, May-June 1988, at 34.

Perhaps the greatest worry of Chinese regulators with respect to foreign trade has been the insatiable demand for imports which, left uncontrolled, could drain China of foreign exchange. Particularly with the entry of inexperienced participants into the realm of foreign trade, the dangers of heavy borrowing and shoddy imports were both presented. Central controls have been implemented to address these challenges, but their effectiveness has been limited. Once new avenues were opened up beyond the reach of the central planners, it became very difficult to control the forces unleashed.[44]

Of equal concern to the PRC has been its treatment under the foreign trade laws of other countries, particularly those of the United States. The 1988 Omnibus Trade Bill, which affected U.S. trade relations with almost all of its trading partners, was predicted to have significant effects on U.S.-China trade.[45] Trade relations with the PRC have been affected, but not necessarily as the authors of the trade originally envisioned.

One of the PRC's persistent problems with the United States has been the spate of anti-dumping suits brought by U.S. companies seeking to eliminate competitive low-price imports from the PRC. Under United States trade laws, the Commerce Department may order anti-dumping duties to be imposed on imports of goods sold in the U.S. for "less than fair value." In the case of China, and other non-market economies, this process has involved calculating a fair market value based on prices in a surrogate market-economy country at the same level of economic development to determine values more reliable than those established by a centrally planned, non-market economy.[46] Unfortunately, proposals to rationalize the treatment of non-market economies floated during the drafting of the Omnibus Trade Bill were not incorporated in the final legislation. As a result, China remains subject to the vagaries of U.S. trade policy, and importers remain as little able to predict the likelihood of anti-dumping duties being levied as they were before this legislative overhaul. Worst of all, obvious comparative advantages which the PRC enjoys are largely ignored by the methodology the new law has adopted.[47]

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[44] *See* "Peking's About-Face on Trade Reform Leads China in the Wrong Direction," *Business China*, Sept. 11, 1989, at 129.

[45] Cohen, "Omnibus Trade Bill: Potential Effects on U.S.-China Trade," *East Asian Executive Reports*, February 1988, at 7. The bill as finally passed was entitled, "Omnibus Trade and Competitiveness Act of 1988," Pub. L. No. 100–418, pt. 4, Secs. 1371–82, 102 Stat. 1107.

[46] The absurdities resulting from such determinations are legion. *See* Alford, "When is China Paraguay? An Examination of the Application of the Antidumping and Countervailing Duty Laws of the United States to China and other "Nonmarket Economy" Nations,"61 Southern California Law Review 79 (1987).

[47] Neely, "Nonmarket Economy Import Regulation: From Bad to Worse," 20 Law and Policy in International Business 529 (1989).

Recent controversy over the extension of Most Favored Nation (MFN) status to the PRC has once again highlighted China's peculiar position as a trading partner of the U.S. Although China was granted MFN status in the year following normalization of relations, continued enjoyment of that status was made contingent on an annual review by the President and Congress, an unusual provision stemming from Congressional discomfort at extending MFN to the PRC originally. During the past year, a number of bills have been introduced in Congress to make continuation of China's MFN status contingent upon human rights improvements in the PRC.[48] While the prevailing sentiment seems to support President Bush's decision of May, 1990 to extend China's MFN status for another year, the uncertainty generated by the annual review process further exacerbates the precariousness of U.S.-China trade relations.

V. Conclusion

At this juncture, it is difficult to predict future developments with any assurance. Clearly, the PRC has demonstrated its commitment to the use of legal regulation to encourage foreign investment; without such laws, the current levels of investment would never have been reached. As China has become more familiar with the mechanisms for regulating foreign investment and with modern commercial law, its skill in legislation and enforcement has grown commensurately. Now that devices such as contract have become the norm in domestic economic relations, their use in foreign trade and investment no longer seems exceptional. After a period of experimentation and learning from its mistakes in this area, the PRC seems to have settled upon a clearer, more detailed system of law and regulation relating to foreign trade and investment. The passage of time and the benefit of experience has also provided foreign investors the knowledge necessary to challenge those aspects of Chinese foreign-related law which have disadvantaged foreign trade and investment and to make useful suggestions which will encourage foreign participation in China's economy. Despite some gaps and occasional disappointments, the past decade has seen an encouraging development of legal consciousness with respect to foreign trade and investment in the PRC.

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[48] *E. g.*, H.R. 4939, 101st Cong., 2d Sess., approved by the House Ways and Means Committee on July 18, 1990.

REFORM AND RETRENCHMENT IN CHINA'S SPECIAL ECONOMIC ZONES

By George T. Crane *

CONTENTS

Page
I. Introduction/Summary 841
II. Policy and Economic Performance 843
  A. Special Economic Zone Policy 843
  B. Economic Performance of Shenzhen 844
  C. The Xiamen, Zhuhai, Shantou, and Hainan Zones 848
III. Politics 851
  A. The Cycle of SEZ Politics 851
  B. The 1988 Retrenchment 853
  C. The Impact of the Beijing Massacre 854
  D. The Return to Reform 856

I. INTRODUCTION/SUMMARY

China's Special Economic Zones (SEZs) encompass all of the complexities and difficulties of the country's reform project. They are leaders in market-oriented economic restructuring and in opening China to the world economy. Taken together, the five SEZs are home to about one-fifth of all foreign investment in China. The Shenzhen SEZ is second only to Shanghai in exports and is vying to establish the PRC's first full-fledged stock market.[1] In the past two years, the Xiamen SEZ has become a major hub of Taiwan-financed joint ventures. Hainan province aspires to the rank of "most special" of SEZs. Even the less well-known zones in Zhuhai and Shantou have made significant strides in economic reform and openness. Yet for all of their accomplishments, SEZs have been vexed by persistent troubles. Infrastructural development has been expensive and inefficient; management has been fraught with charges of corruption; and foreign investment has been periodically disrupted by changing administrative rules and political controversies. In short, SEZs have produced both disappointments and benefits.

Over the past decade, SEZ gains and losses have fallen into a cyclical pattern of development.[2] Boom years have seen remarkable bursts of economic growth, foreign investment, and international trade. Such robust performance has inspired extensions of zone policy to other coastal areas. In 1984, optimistic assessments of SEZ

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[1] The comparison with Shanghai is made in: *China Today*, 39,6 (June 1990):24.

[2] George T. Crane, *The Political Economy of China's Special Economic Zones* (Armonk, NY: M.E. Sharpe, 1990), chapter 6.

success encouraged the opening of fourteen coastal cities to greater foreign economic participation. Similarly, in early 1985, three larger delta regions were granted SEZ-like preferences. At the other extreme, revelations of costliness and malfeasance have brought on occasional retrenchment. In mid-1985, SEZs were subjected to withering criticism and increasing regulation. Political discord has also hampered zone reform. In 1987, the fall of Communist Party General Secretary Hu Yaobang and the subsequent anti-bourgeois liberalization campaign sent a chill through the Shenzhen SEZ.

Retrenchment, however, has usually been short-lived. SEZ critics are not unrepentant Maoists longing for a self-reliant, autarkic past. They are technocrats interested in modernizing the country—within certain economic, political, and ideological limits. Their attempts to counter preceived SEZ shortcomings have often contradicted their desire for development. When economic liberalization is constrained, foreign investors reduce their commitments, robbing the zones, and the country as a whole, of the wherewithal for economic modernization. The result is usually a return to liberalizing intiatives, at least until the next local scandal or national crisis. The SEZs are, therefore, both unstable and durable. They are inherently costly and evoke powerful condemnation but cannot be easily restricted or dismantled.

The events of the past three years, 1988–1990, have repeated the cycle of reform and retrenchment in the SEZs. For the first three quarters of 1988, Communist Party General Secretary Zhao Ziyang energetically sponsored coastal development, an effort that lifted the fortunes of the SEZs. The nationwide economic rectification in the fall of 1988 did not spare the zones, however. Infrastructural development was cut, foreign exchange preferences were rescinded, and zonal economic strategy was called into question. The Beijing massacre and fall of Zhao Ziyang in 1989 made matters worse. A number of key SEZ administrators were closely tied to Zhao and his demise weakened the political basis of zone policy. Throughout the summer the future of SEZs was uncertain and foreign investment stagnated. The tide turned in the fall when the reconstituted Beijing leadership endorsed SEZ policy at the Fifth Plenum of the Thirteenth Central Committee. In the first half of 1990, reform was again the priority.

The 1988–1990 period is not exactly the same as previous cycles of reform and retrenchment. The depth of the 1989 political crisis was unprecedented. This, however, did not preclude a reform revival. Perhaps more noteworthy is the introduction of significant levels of investment from Taiwan. In Xiamen, Taiwan is now the single largest "foreign" investor. The increasing presence of Taiwan capital on the mainland may have important implications for the political reconciliation of the PRC and the ROC.

II. Policy and Economic Performance

A. SPECIAL ECONOMIC ZONE POLICY

China's SEZs were instituted in 1979.[3] Shortly after the landmark Third Plenum of the Eleventh Central Committee meeting in December 1978, the Shekou Industrial District was opened in Guangdong Province. Guangdong officials soon established three "Special Economic Zones" in Shenzhen (which includes the smaller Shekou district), Zhuhai, and Shantou. After some parochial bickering, Fujian province announced plans to establish a fourth SEZ in Xiamen. Hainan Island was not formally identified as an SEZ until 1988.

SEZs are loosely modeled on Export Processing Zones (EPZs) found in other less developed countries. They are specifically delineated areas within which a variety of economic inducements are offered to foreign investors in an effort to turn global opportunities toward national development. Ideally, overseas investors enjoy preferential tax rates, reduced tariffs, flexible labor and wage policies, more modern infrastructure, and less bureaucracy than elsewhere in China. In practice, the SEZ competitive edge has dulled over the years due to recurrent government interventions and the diffusion of reform policies to other coastal areas.

The objectives of China's zone policy are ambiguous.[4] The scope of economic activity is broader than the usual EPZ focus on processing and assembly for export. Agriculture, manufacturing, heavy industry, and infrastructural development are all encouraged and open to foreign investment. The size of the SEZs, especially Shenzhen's 327 square kilometers, also distinguishes them from EPZs, which are often less than 10 square kilometers in area. Nevertheless, the typical EPZ development strategy has been espoused by SEZ administrators. This favors the creation of export-oriented joint ventures and foreign subsidiaries that will provide employment for Chinese workers, managerial experience for Chinese technicians, and markets for Chinese raw materials and inputs. Such an "outward-oriented" strategy contrasts with an "inward-oriented" development plan advocated by some SEZ supporters. This latter approach emphasizes import-substituting production by foreign-funded enterprises. Advanced industrial technology would also be directly transferred through SEZs to the hinterland. Evaluations of SEZ success or failure depend upon which strategy is used as a standard.

By either strategy, SEZs must advance domestic economic restructuring. Successful export promotion and import substitution require improved product quality and productivity. To attain these ends, SEZ administrators have been in the vanguard of institutional reform, reducing party interference in factories, introducing market regulation, and nurturing entrepreneurship. Some of the country's boldest reform experiments are to be found in the SEZs:

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[3] Excellent analyses of early zone policy are: Victor Falkenheim, "China's Special Economic Zones," in U.S. Congress, Joint Economic Committee, *China's Economy Looks to the Year 2000*, vol. II, (Washington, GPO, 1986), pp.348-370; Suzanne Pepper, "China's Special Economic Zones," *USFI Reports*, 14, 1986.

[4] Crane, 1990, pp. 40-48, 116-122.

public bidding for land rights, commercialization of housing, and stock trading. As in other socialist states, the transition to a market-based economy has created new problems. Inflation and unemployment have, at times, been troublesome. But these are offset by the perceived quality of life in the SEZs. Young and talented Chinese from all over the country, enthusiastic for economic change, long to work in the SEZs.

The actual performance of SEZs reflects their dual character, outward- and inward-oriented. Foreign investment has been drawn into the zones and export industries have been established. In ten years, the five SEZs have attracted a cumulative total of roughly US$ 4.1 billion in *actual* foreign investment and exported over US$ 10 billion worth of products. This is no mean accomplishment in that, before 1979, the SEZ localities were sleepy coastal towns of negligible economic significance. As they turned toward the world, however, SEZs became more closely linked to the national economy. Attracting foreign investment necessitated offering international firms access to the domestic market, a strategy referred to as "exchanging market for technology." [5] Zone-produced goods, many with a very high import content, as well as foreign-made products traded through SEZs, are sold nationwide. SEZs, therefore, have rarely run trade surpluses. Moreover, to maximize linkages between the world market and the domestic economy, Chinese firms from all over the country have been urged to set up operations in SEZs. In Shenzhen, domestic enterprises account for about 40 percent of the gross value of industrial output (GVIO).[6] SEZs thus serve both world market and domestic economy.

B. ECONOMIC PERFORMANCE OF SHENZHEN

Shenzhen is the powerhouse of SEZs. It has the largest economy, the most foreign investment, and the greatest volume of exports (see Table 1).

TABLE 1. Shenzhen SEZ Performance, 1987–1989

Year	GVIO (billion RMB)	Actual Foreign Investment (US $ millions)	Exports (US $ billions)
1987	5.76	404	2.04
	(62)	(–17)	(122)
1988	8.88	444	1.85
	(54)	(10)	(–9)
1989	11.64	458	2.17
	(31)	(3)	(18)

Note: Figures in parentheses are percentage increases over previous year.

Sources: *Far Eastern Economic Review*, March 2, 1989:60; Shenzhen Statistical Bureau, "Shenzhen Vital Statistics Survey, 1989" ["Shenzhenshi 1989 Nian Zhuyao Tongji Shuzi Yilan"].

Shenzhen's economic growth, especially industrial expansion, is extraordinary. Even in "bad" years, such as the 1989 economic contraction, Shenzhen's economy has flourished. High growth rates are due, in part, to the underdevelopment of Shenzhen's economy before 1979. Starting from a very low base, industrialization in the

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[5] *Ibid.*, pp. 80–81.

[6] Shenzhen Statistical Bureau, "Shenzhen City 1989 Vital Statistics Survey."

1980s is statistically stunning. This is not to suggest that growth is simply a mathematical mirage; it is real, propelled by foreign and domestic investment. Actual foreign investment has exceeded US $400 million annually since 1986, when it reached its peak at US $498 million. Pledged foreign investment is typically higher, climbing to a reported US $1.02 billion in 1985.[7] In some years, less than half of pledged investment has actually been used, an indication of wariness among foreign businessmen. Although actual foreign investment has also flucutated over the years—declining in 1982, 1985, and 1987—a steady inflow of overseas capital has facilitated Shenzhen's growth.

More than three-quarters of Shenzhen's "foreign" investment comes from Hong Kong.[8] The SEZ is adjacent to the British enclave and propinquity facilitates movement of capital across the border. In recent years, Taiwan money has become more visible in Shenzhen. By mid-year 1989, approximately 98 Taiwan-funded joint ventures worth US $148 million in "total investment" were in operation.[9] Large firms from North America, Europe, and Japan, such as Digital Electronic Corporation and Seiko, are to be found in Shenzhen but the vast majority of the more than 2,500 registered foreign-funded businesses are small processing and assembly operations from Hong Kong.[10] Real estate development, particularly housing construction for Shenzhen's burgeoning population, has also been a major attraction for Hong Kong investors.[11]

Investment from domestic Chinese sources is the second pillar of the Shenzhen economy. As mentioned above, Chinese enterprises enter the SEZ to take advantage of the relatively liberal environment. Indigenous firms contribute to joint ventures with foreign partners or they link up with other Chinese companies to do business internationally. Other government agencies and financial institutions have also helped to build Shenzhen. Central government budgetary expenditures, loans from national and provincial banks, and funds from central ministries and provincial offices have all supported capital construction in Shenzhen. Taken together, the various forms of domestic investment have exceeded the total amount of actual foreign investment in most years (see Figure 1).[12]

The relationship between domestic and foreign investment is a sensitive issue for Shenzhen. In 1985, domestic spending toppped US $700 million a year and actual foreign investment fell to under US $200 million. Critics argued that scarce national resources were being wasted, not yielding sufficient levels of foreign investment. In the early years of zone policy such complaints were turned aside

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[7] This figure may be inflated by pledged debt, see: Crane, 1990, p. 115.

[8] Figures on Hong Kong capital in Shenzhen are often overstated for two reason: some "Hong Kong" investments are actually the work of discreet Taiwan businessmen; and funds from mainland Chinese organizations are sometimes funneled through Hong Kong for investment in Shenzhen.

[9] Zhongguo Xinwen She, July 5, 1989, FBIS, July 7, 1989:37. "Total investment" includes both domestic Chinese and foreign contributions to joint ventures.

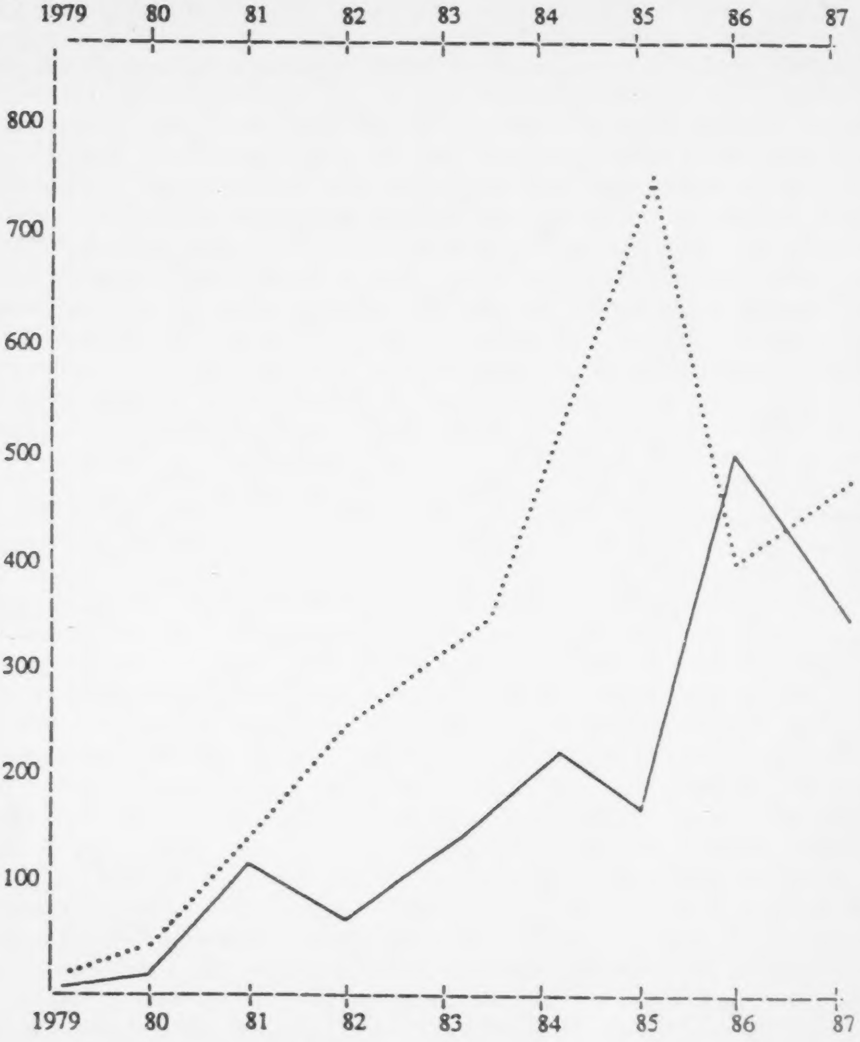
[10] Early reports for 1990 suggest a new problem, however. Hong Kong investors, wary of political and economic risks in China, are looking for investment opportunities elsewhere in East Asia. *Far Eastern Economic Review*, September 20, 1990: 92–93.

[11] Total population, including both "temporary" and permanent residents, for Shenzhen municipality in 1989 was 1.9 million an increase of 25 percent over the 1988 number, see: Shenzhen Statistical Bureau, "Shenzhen Vital Statistics Survey, 1989."

[12] Figure 1 is taken from, Crane, 1990: 151.

FIGURE 1.

A Comparison of Domestic Infrastructural Spending and Actual Foreign Investment in Shenzhen, 1979–1987. (U.S.$ million)



Sources: Derived from tables 3 and 4.

. . . . = domestic infrastructural spending

__________ = actual foreign investment

with the contention that SEZs needed time to mature fully. Over time, however, the problem has persisted. Vice Premier Tian Jiyun, generally supportive of zone policy, warned in 1989 that

Shenzhen "should not rely on state funds." [13] He thus recalled political, as well as economic, vulnerabilities. It is questionable whether Shenzhen's rapid growth could be sustained without domestic investment. Moreover, competing regional and bureaucratic interests can, and do, argue that the money would be better spent on their pet projects, developing the Pudong zone in Shanghai, for example, or adopting a sectoral industrial policy.

Although domestic investment is double-edged—it both fuels growth and sparks controversy—the resultant economic development has clearly boosted Shenzhen's international trade. Before 1979, its major export was people who slipped across the border to find better lives in Hong Kong. After a decade of investment and growth, Shenzhen now exports upward of US $2 billion of goods annually. A significant portion, over 75 percent, of these products, are manufactures.[14] Export figures must be interpreted with care, however. Goods from other parts of the country are transhipped through Shenzhen and are often reported as SEZ exports. This confounds precise measurement of zone-produced exports, but it does not negate the fact that export-oriented manufacturing has arisen in Shenzhen.

On the other side of the ledger, Shenzhen's imports have usually outstripped exports. In 1984, for example, when exports totaled approximately US $265 million, imports surged to US $807 million.[15] A number of factors contribute to strong import demand. Expensive capital goods must be purchased to build Shenzhen's export base. In addition, the many assembly and processing enterprises in the SEZs are import dependent, relying upon components and materials from overseas suppliers. Consumer goods are also shipped, legally and illegally, through Shenzhen to anxious buyers all over China. Trade deficits are, therefore, the rule for Shenzhen. Official figures suggest that the pattern was reversed in 1988 and 1989 with trade surpluses of US $260 million and $570 million, repectively. These numbers probably under-report imports, however, casting doubt on the achievement of surpluses.[16]

In sum, many of Shenzhen's economic gains are matched by frustrations. Rapid growth comes at a high price in national investment. Exports are borne on a tide of imports. Other facets of zone policy are equally ambiguous. Technology transfer, which is difficult to measure precisely, has occurred, especially through the larger joint ventures, but with few of the dramatic breakthroughs envisioned by optimistic SEZ proponents. The profusion of small processing and assembly enterprises and the appeal of real estate development are not conducive to large-scale technology upgrading. One result, however, may transcend contervailing costs. The entrepreneurial initiative unleashed in Shenzhen, and throughout the Pearl River Delta, has spawned a multitude of small independent businesses. The productivity and flexiblity of this nascent private sector may be China's best hope for managing successfully the rigors of economic reform.

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[13] Beijing Radio Report, FBIS, March 27, 1989, p. 23.

[14] Detailed and reliable composition of trade figures are not available. The 75 percent figure is based on a report that 58 percent of GVIO is exported, see: Shenzhen Statistical Bureau, "Shenzhen Vital Statistics Survey, 1989."

[15] *People's Daily*, December 13, 1985.

[16] *Far Eastern Economic Review*, March 2, 1989:60 reports 1987 Shenzhen imports as US $2.25 billion. The Shenzhen Statistical Bureau states the 1988 figure as US $1.59 billion. Either one source is inaccurate or Shenzhen's imports dropped by roughly 30 percent in 1988, a year of booming growth in the SEZs and expanding imports natiowide. Since official figures are periodically revised, and sometimes do not count the import content of exported manufactures, a certain skepticism toward the claim of a trade surplus is warranted.

C. THE XIAMEN, ZHUHAI, SHANTOU, AND HAINAN ZONES

China's other SEZs have generally followed Shenzhen's pattern of development, albeit on smaller scales. After a slow start, Xiamen has become the second most important SEZ. In the past two years, Xiamen's foreign investment and exports have expanded considerably (Table 2).

TABLE 2. Xiamen SEZ Performance, 1987–1989

Year	GVIO (billion RMB)	Planned Foreign Investment (US $ millions)	Exports (US $ billions)
1987	3.174	58	304
	(47)	(111)	(44)
1988	n.a.	134	500
		(131)	(64)
1989	n.a.	769	1983
		(474)	(297)

Note: Figures in parentheses are percentage increases over previous year.

Sources: *Far Eastern Economic Review*, March 2, 1989:60; Xinhua News Service, February 20, 1989, FBIS, February 24, 1989:48; *People's Daily*, January 29, 1990:2, FBIS, February 15, 1990:19.

The reason for Xiamen's recent success is Taiwan capital. In 1988, 80 Taiwan-funded projects were planned for Xiamen. This was a remarkable turn of events as only about 20 Taiwan ventures had been negotiated previously.[17] Taiwan companies signed 138 more agreements in 1989.[18] The year was very good for Xiamen, compared to most other parts of the country, because Taiwan businesses did not retreat in the aftermath of the Beijing massacre.[19] Moreover, future prospects are bright. Formosa Plastics, one of Taiwan's largest multinational corporations, is planning a US multibillion dollar petrochemical plant for Xiamen. If the proposal withstands criticism from the Taiwan government, it would be one of the largest foreign enterprises in China.

The current bull market in Xiamen has not come free of charge. In the past eight years capital construction has totaled 3.7 billion yuan, mostly from Chinese sources.[20] Xiamen has not, however, attracted as much criticism as Shenzhen for "relying on state funds." Perhaps Shenzhen's notoriety has politically shielded the other SEZs. Xiamen's development has also been import-dependent. In 1987, it reported a trade deficit of US $184 million. The absence of reliable import figures for 1988 and 1989 suggests that this trend has yet to be reversed.

The Zhuhai SEZ in Guangdong province has fared less well than Xiamen in the past two years. Situated next to the Portuguese enclave of Macao, Zhuhai was to be a counterpart to Shenzhen. Although much smaller (15.6 square kilometers), it was originally planned as a "comprehensive" SEZ, open to a wide variety of foreign projects. Real estate development, tourism, processing and assembly enterprises, and some higher technology industrial firms contributed to its economic growth in the early years. 1988 was the high point with industrial production doubling and actual foreign investment tripling (Table 3).

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[17] Derived from Xinhua, FBIS, January 4, 1989, p. 78.

[18] Xinhua, FBIS, January 10, 1990, p. 35.

[19] Zhongguo Xinwenshe, FBIS, July 7, 1989, 89-129, p. 37.

[20] *People's Daily*, January 29, 1990:2, FBIS, February 15,1990:19.

TABLE 3. Zhuhzi SEZ Performance, 1987–1989

Year	GVIO (billion RMB)	Actual Foreign Investment (US $ millions)	Exports (US $ billions)
1987	1.215	69	319
	(80)	(−8)	(122)
1988	2.54	218	421
	(110)	(216)	(32)
1989	2.95	249	350
	(16)	(14)	(−17)

Note: Figures in parentheses are percentage increases over previous year. 1989 numbers are estimates.

Sources: *Far Eastern Economic Review*, [*FEER*] March 2, 1989:60; *People's Daily*, September 11, 1989:4, FBIS, September 20, 1989:43.; *Ming Pao*, January 7, 1990:18, FBIS, January 12, 1990:38; *FEER*, February 8, 1990:38.

The turnabout in 1989 was worse than the official statistics suggest. Although both industrial output and foreign investment apparently grew at relatively modest rates, other sources indicate that nearly 30 percent of the zone's factories were forced to shut down.[21] This casts doubt on whether industrial production could have grown 16 percent. The reasons for Zhuhai's woes were a combination of nationwide economic retrechment begun in the fall of 1988, which curtailed domestic investment, and wariness on the part of foreign businesmen, who scaled back their activities. Zhuhai had neither Xiamen's concentration of Taiwan capital nor Shenzhen's volume of prior foreign investment commitments to carry it through 1989.

The fourth original SEZ, Shantou, trails the other three in trade and investment (Table 4). Its location, further away from Hong Kong than Shenzhen or Zhuhai, is partially responsible for its sluggishness. It also lacks the strong historic ties to Taiwan that have helped Xiamen so much. Shantou's comparatively large GVIO is not an accurate indicator of development in the 1980s; the city had a broader industrial base prior to 1979 than the other SEZs.[22]

Unlike the other SEZs, Shantou's performance in 1988 was not good. Indeed, the success of other zones and coastal cities may have come at Shantou's expense, as indicated by the 58 percent decline in actual foreign investment. The next year was no better. Partial figures show that the number of "projects using foreign funds" fell by almost half in 1989, from 238 in 1988 to 120.[23] The "total invest-

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[21] *Far Eastern Economic Review*, February 8, 1990, pp. 38–39.

[22] Shantou Municipal Office, *Handbook on Investment and Tourism in Shantou* (Beijing: Beijing Review, 1986), pp. 22–30.

[23] *Ming Pao*, January 22, 1990, FBIS, January 25, 1990, p. 25.

TABLE 4. Shantou SEZ Performance, 1987–1988

Year	GVIO (billion RMB)	Actual Foreign Investment (US $ millions)	Exports (US $ billions)
1987	4.75	81	279
	(35)	(47)	(−4)
1988	5.47	34	298
	(15)	(−58)	(7)

Note: Figures in parentheses are percentage increases over previous year.
Sources: *Far Eastern Economic Review*, March 2, 1989:60; *People's Daily*, September 11, 1989:4, FBIS, September 20, 1989:43.

ment" of these projects also dropped from US $200 million to US $150 million. Shantou thus remains the least dynamic SEZ.

Hainan island has had mixed fortunes since it officially became a special zone in 1988. Development in the first year was complicated by its simultaneous elevation to provincial administrative status. Basic governing institutions had to be built from scratch. Economically, it had little in the way of modern economic infrastructure. In light of these conditions, Hainan reformers had to devise a novel approach to SEZ development. They decided to lease a large tract of land to foreign investors for a long period of time. Thus 45,000 mu ($30km^2$) in the Yangpu area of Northwest Hainan would be let for 70 years at a rent of 2000 yuan per mu.[24] The lead investor was a Japanese-based firm, Kumagai Gumi, but overseas Chinese capital was involved as well. The foreign partners were contracted to build modern port facilities, a power plant, and several heavy industrial projects. The area would be managed as a "free port," minimizing economic regulations. To Hainan administrators, Yangpu offered large-scale development with little strain on national resources.

The Yangpu scheme, controversial from the start, ran into serious problems in 1989. Political resentment toward preceived subservience to foreigners and bureaucratic obstacles to effective implementation have cast doubt on the project's viability. Foreign investment from other sources has begun to flow into Hainan. According to incomplete data, Hainan attracted approximately US $350 million in planned foreign investment in 1988.[25] Pledges fell in 1989 by 26 percent to US $280 million.[26] Although the daring Yangpu project is uncertain and economic infrastructure is outmoded, Hainan island is gradually being transformed into an SEZ.

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[24] *Jingji Ribao*, August 10, 1989, p. 2, FBIS, August 31, 1989, p. 40.

[25] Xinhua, FBIS, December 30, 1988, 88–251, p. 59. A later analysis states 463 contracts signed in 1988 with US $600 million in planned foreign investment, of which US $110 million had actually been utilized, see: Xinhua, FBIS, March 29, 1989, p. 58. The US $600 million seems unlikely, however, since *Far Eastern Economic Review*,, August 23, 1990, implies about US $353.

[26] *Far Eastern Economic Review*,, August 23, 1990. These numbers contradict an earlier report of 344 new foreign investment enterprises worth US $370 million in planned investment by October of 1989, see: *Wen Wei Po*, January 5, 1990, FBIS, January 23, 1990, 90–015, p. 48.

III. POLITICS

A. THE CYCLE OF SEZ POLITICS

Since their inception, China's SEZs have been buffeted by domestic politics as fluid coalitions of supporters and detractors attempt to, respectively, expand or reduce the scope of zone policy. Opposition has been evident from the start. Bureaucratic, regional, and ideological political forces wary of economic change have warned of a variety of SEZ ills, from foreign exchange imbalances to "Hong Kong-ization." In the early years, SEZ supporters were able to hold skeptics at bay with promises of positive results that would offset most concerns. As time went on, powerful national leaders publicly acclaimed SEZs. Party General Secretary Hu Yaobang energetically backed zone policy in 1983 and Deng Xiaoping offered his praise during a much-heralded trip to Shenzhen, Zhuhai, and Xiamen in 1984. Solid political support reassured foreign investors and engendered domestic budgetary outlays for SEZ development. Expansion of zone policy to other coastal cities and regions followed in 1984 and early 1985. SEZs seemed invincible.

The situation deteriorated rapidly in March 1985, when national and local economic problems animated SEZ critics. Vice-Premier Yao Yilin and Communist party ideologue Hu Qiaomu, openly challenged zone policy. Retrenchment ensued with the reimposition of central government oversight to combat foreign exchange losses, smuggling, and dependence on state funds. The changed political atmosphere caused Deng Xiaoping to back off his previous pro-zone stance; association with an apparent policy failure could have negative political ramifications, even for the paramount leader. Recentralization could not last, however. Increased regulation by more government agencies undermined SEZ comparative advantage in attracting foreign capital. Conservative technocrats, worried that economic modernization might be derailed by declining foreign investment, thus acquiesced in a revival of reform initiatives. By the end of 1986, the ethos of accelerated SEZ development and expansion was ascendant.

The regeneration of reform in 1986 was cut short by the anti-bourgeois liberalization campaign of 1987. Although the economic framework of zone policy was not altered by political events, as was the case in 1985, foreign investors were scared off. Actual foreign investment for 1987 decreased in Shenzhen, Xiamen, and Zhuhai.[27] The pall of political disfavor was lifted by a resurgence of the liberal agenda at the Thirteenth National Party Congress in November 1987.

Following the conclave, newly appointed party General Secretary Zhao Ziyang unequivocally advocated zone expansion during a three-month trip of coastal provinces. Zhao outlined a far-reaching development policy, which would extend liberalization beyond the existing open cities, zones, and deltas, to include virtually all of China's coastal territory.[28] As the year progressed and the proposal was implemented, 288 counties in 10 provinces, encompassing 320,000 square kilometers of land and 160 million people, were given SEZ-like preferences.[29]

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[27] *Far Eastern Economic Review*, March 2, 1989:60.

[28] *People's Daily*, January 23, 1988:1; *Beijing Review*, February 8, 1988:14-19.

Coastal development magnified the significance of SEZs. If the entire coast opened more widely to the world economy, the four original zones would be national models of international economic integration.[30] Ironically, the coastal strategy also robbed SEZs of their specialness. Other areas, especially the townships of the Pearl River Delta, could offer incentives (low-wage labor, tax preferences, cheap land-use fees, etc.) comparable, if not superior to, SEZs. On balance, however, the coastal strategy helped zone policy more than it hurt. Buoyed by the renewed national spirit of economic opening, SEZ administrators redoubled their efforts at reform. In Xiamen, local leaders worked in earnest to attract Taiwan capital.[31] Fujian provincial officials also made a bid for Taiwan-funded enterprises, announcing that several Taiwan investment zones would be established around the province.[32]

Hainan island reflected the liberal tenor of the time. Having been granted provincial status and formally declared an SEZ at the first session of the Seventh National People's Congress in early 1988, Hainan was the most ambitious project of coastal development. The local leadership promised to make their SEZ-province more "special" than other zones. Perhaps the best indication of Hainan's commitment to bold liberalization was its governor: Liang Xiang. As mayor of Shenzhen from 1981 to 1985 Liang had firmly established his reformist credentials; few national figures were as outspoken and energetic in their support of opening China to the world economy. No image better captures the resurgence of zone policy in 1988 than Liang Xiang at the helm of the most special of SEZs.

Revived enthusiasm for SEZs was both a consequence and a cause of national political dynamics. Most important in this regard was the position of Zhao Ziyang. Although he had backed SEZs since 1979, Zhao tended to be circumspect in his support, sensitive to the limits and failings of international opening.[33] His advocacy of coastal development signaled a lessening in his ambivalence. Zhao was now personally linked to the extension of zone policy all along the eastern seaboard. If SEZs or coastal development failed, Zhao's political standing could be endangered. He was thus running a political risk but he may have had little choice. Hu Yaobang's fall in 1987 revealed the strength of ideological conservatives and reform skeptics. To counter these political forces, strong pro-reform constituencies had to be created. Insofar as coastal development gave provincial and local officials a greater stake in the open policy, it widened Zhao's political base. He would be their benefactor. Political concerns, therefore, may have inspired Zhao's push for SEZ expansion and coastal development.

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[29] Xinhua July 5, 1988, FBIS, July 6, 1988, p. 43.

[30] This point was made in a report by the Economic Structural Reform Research Institute, the Beijing think-tank headed by Chen Yizi. They stressed SEZ contributions to structural reform, especially in furthering the "competitive pluralization of enterprise structure," and the creation of "independent entrepreneurs." See: *Shenzhen: Xintizhi* Yanjiu (Shenzhen: Zhonggong Shenzhen Shiwei Zhengce Yanjiushi, 1988), chapter 1.

[31] FBIS, June 7, 1988, p. 65.

[32] CEI Database (Beijing) report, FBIS, August 23, 1988, p. 37.

[33] Crane, 1990, pp. 137–138.

Zhao's coastal gambit was well played in early 1988. Premier Li Peng promoted Hainan's move to provincial status, suggesting that he was not opposed to SEZ expansion.[34] Although Zhao would later clash with Li over economic strategy, the General Secretary's coastal policy did not diverge widely from the Premier's position. Zhao also enjoyed the apparent support of Deng Xiaoping, who reverted to a pro-zone stance in June.[35] The year was shaping up well for SEZ advocates.

B. THE 1988 RETRENCHMENT

Circumstances changed, however, in September. The nationwide economic retrechment inaugurated at the Third Plenum of the Thirteen Central Committee spared neither SEZs nor coastal policy. In the wake of the Plenum, the percentage of earned foreign exchange retained in SEZs was reduced from 100 percent to 80 percent.[36] This was especially hurtful because one of the few advantages SEZ administrators had in the keen national competition for overseas investment was their foreign exchange reserves. By one estimate, Shenzhen alone stood to lose US $70 million in foreign exchange that it would now have to remit to Beijing.[37] SEZs were also subject to the recentralization of trade policy and the approval process for foreign investment implemented throughout the country.[38]

Economic retrenchment changed the political context. Criticisms of coastal policy and SEZs were raised by both liberals and conservatives.[39] Zhao Ziyang and others fought back, assuring foreign investors that the coastal policy would be unscathed by retrenchment.[40] In making this argument, however, Zhao began to waver in his support of the SEZs.[41] He characterized zones as "correct and successful" but said that *new* reforms "can become possible only when Shenzhen does not affect the conditions in the interior areas." With this statement, he implicitly accepted the argument that zones did not sufficiently promote inland development. He may have been indicating limits to SEZ development in order to preserve what had already been accomplished there. Alternatively, he may have been willing to countenance restrictions on SEZs so as to deflect criticism away from the larger coastal policy, which was politically more sensitive for him. As further suggested by the dissipation of SEZ preferences, Zhao was possibly sacrificing zones to save the coastal strategy.

Zhao's problems mounted, however, as differences over coastal policy came out into the open at the second session of the Seventh

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[34] *Ibid.*, pp. 139–140.

[35] *Hong Kong Standard*, August 12, 1988, p. 6, FBIS, August 12, 1988, p. 54.

[36] *Wen Wei Po*, October 15, 1988, p. 2, FBIS, October 19, 1988, pp. 38–39.

[37] *South China Morning Post*, January 4, 1989, FBIS, January 4, 1989, p. 68.

[38] *South China Morning Post*, February 1, 1989, FBIS, February 1, 1989, p. 60; *People's Daily*, March 16, 1989, FBIS, March 23, 1989, p. 64.

[39] For a fuller analysis of the politics of this period see: George T. Crane, "China's Special Economic Zones in 1989: Continuity and Change," *Issues and Studies* (Forthcoming).

[40] FBIS, December 5, 1988, p. 28.

[41] *Wen Wei Po*, February 9, 1989, p. 1, FBIS February 9, 1989, p. 10; *South China Morning Post*, February 10, 1989, p.8, FBIS, February 10, 1989, p. 23.

NPC in March 1989. Premier Li Peng, in his government work report to the NPC, began to move away from his earlier endorsement of Zhao's coastal policy.[42] Li was not looking to return China to the Maoist past; he promised to honor all existing contracts and promote international trade. What he resisted was the threat of trade imbalances and inflation bred of decentralized economic power.

Nor was Li an unregenerate SEZ hater. While no doubt wary of expanding zone reforms to the coastal region as a whole, he was willing to allow SEZs to experiment in new ways. At the NPC meeting it was Li who submitted a controversial plan granting greater legislative autonomy to local Shenzhen authorities.[43] On the other hand, Li would not shield zones from economic rectification as evidenced by the State Council's limitation on SEZ foreign exchange retention. Perhaps he was not worried about the national impact of local Shenzhen legislation because the macroeconomic environment was coming under tigher central control. The overall effect of Li's activities was to deflate the previous celebration of coastal develoment. He did not reject, at this point, coastal strategy or SEZs per se but he did make clear his priority of financial stability.

The opening months of national austerity were thus a trial for SEZs. Revocation of foreign exchange preferences and other reform measures vitiated the zones' uniqueness. A range of criticism, from conservative to liberal, undercut their credibility. Hainan's Yangpu plan was attacked for "selling out to the Japanese." And, to add insult to injury, key central sponsors appeared ready to sacrifice SEZs to save the coastal strategy. As bad as the situation was, however, it worsened after the Beijing massacre.

C. THE IMPACT OF THE BEIJING MASSACRE

The 1989 crisis had two principal effects on zone policy. First, it left SEZ activists politically vulnerable. Many zone officials had close ties to Zhao Ziyang and they were liable to be implicated in the General Secretary's disgrace. Second, as Zhao fell, policies closely associated with him were cast into doubt. Would the coastal strategy continue? If it was undone, what would become of SEZs? Such fundamental political and policy questions dominated the balance of 1989.

Although SEZs were not a focal point of the national student movement, they were involved. The Shekou Industrial Zone in Shenzhen, headed by Yuan Geng, funneled 100,000 yuan to the Beijing protestors, making it one of the leading financiers of the movement.[44] Perhaps this is what Deng Xiaoping had in mind on June 9 when, in a nationally circulated speech to martial law cadres, he castigated SEZs for "obvious inadequacies".[45] Deng equivocated yet again and, in doing so, clouded the future of SEZ reform.

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[42] See Text of Li's speech in: FBIS, March 21, 1989, pp. 24-25.

[43] FBIS, March 28, 1989, 89-058, p. 9.

[44] *South China Morning Post*, September 15, 1989, FBIS, September 15, 1989, p.8.

[45] *Beijing Review*, number 28, July 10-16, 1989, p. 20.

The more immediate trouble for SEZs was the impending campaign against corruption in Guangdong and Hainan. Southern provinces had their fair share of corruption, but the intensity and scale of the ensuing crusade suggests a political rationale as well. One of the first to be accused was the most prominent: Hainan governor, Liang Xiang. In July, Liang was summoned to Beijing were he remained for several weeks as an investigation into his alleged economic crimes commenced.[46] His close personal ties to Zhao Ziyang and Zhao's sons complicated his case. Finally, in September, Liang was relieved of all his offices by the Central Committee and the State Council. Liu Jianfeng, a Jiang Zemin protege, was named governor of Hainan.

Liang's fall sent a chilling political message to all SEZ admirers. He was among the most senior and well-connected of reformers. His impressive *guanxi* network, which a few weeks earlier insured his political safety, was transformed, virtually overnight, into a reason for his demise. As could be expected, Zhao Ziyang's sons, with whom Liang had worked in both Shenzhen and Hainan, were also charged with economic crimes. These three cases turned the national spotlight on corruption in SEZs. Ultimately, though, all charges against Liang were dropped. He was pushed out of office but not officially convicted of malfeasance.[47] His fame may have saved him. Prosecutors had to limit action against him for fear of scaring off foreign investors. Liang, as a symbol of international openness, was useful even for the conservative Beijing leadership.

Other SEZ leaders felt the glare of official scrutiny. Li Hao, mayor of Shenzhen, was investigated for corruption.[48] The mayor of Zhuhai, Liang Guangda, was formally reprimanded for living in an overly sumptuous residence.[49] The cluster of corruption reports stigmatized the open policy and weakened the political standing of local reformers.[50] In addition, an inquest into Yuan Geng's support of the Beijing students, hampered the administration of the most progressive SEZ enclave, the Shekou Industrial District. The witchhunt threatened to quash zone policy.

The full extent of the crisis of zone policy was not readily apparent in the summer of 1989. After the Beijing crackdown, official pronouncements asserted that the open policy had not changed and foreign investors were welcome.[51] Ominous silence, however, implied that the entire coastal strategy was being reconsidered. From Zhao Ziyang's fall until October, coastal development was not mentioned by leading policymakers or by the press; it became an nonissue. A long article on open policy in the September 22 edition of *People's Daily*, for example, not only failed to refer to coastal development, but it provided grounds for abandoning it.[52] Deng Xiaoping's public reproach of SEZs was not rebutted. Other hints that the coastal strategy and SEZs were in dire straits were to be found. In August, Lei Yu, vice-mayor of Guangzhou said that international economic policy was shifting from a "regional inclination" to a "sectoral inclination." [53] This pointed to less emphasis on coastal areas in particular and more attention to "strategic industries." [54] Such a sectoral approach was discussed in the rough drafts of the Eighth Five-Year Plan.[55] By moving away from geographical categories, this industrial policy threatened to undermine the integrity of SEZs, which are territorially defined.

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[46] *South China Morning Post*, July 6, 1989, FBIS, July 6, 1989, p. 66. ; *South China Morning Post*, September 4, 1989, FBIS, September 5, 1989, p. 26; The official announcement of his dismissal is made by Xinhua on Spetember 14, 1989, FBIS, Setpember 15, 1989, pp. 7–8.

[47] *South China Morning Post*, January 25, 1990, FBIS, January 30, 1990, p. 37.

[48] *South China Morning Post*, September 15, 1989, FBIS, September 15, 1989, p. 8.

[49] *Wen Wei Po*, November 11, 1989, FBIS, November 20, 1989, p. 49.

[50] In June, 1990, Li Hao lost his position as mayor of Shenzhen, though he remained party secretary.

[51] Xinhua, FBIS, June 15, 1989, p. 35.; *Liaowang* (Overseas Edition), number 27, July 3, 1989, FBIS, July 14, 1989, p. 11.

[52] *People's Daily*, September 22, 1989, p. 1, FBIS, September 22, 1989, p. 11.

D. THE RETURN TO REFORM

Doubts about the status of SEZs and coastal development persisted until the Fifth Plenum of the Thirteenth Central Committee in November. A short but salient passage in the Plenum's primary document acknowlegded SEZs and coastal policy: "The basic policies and measures for SEZs and coastal open areas will remain and will be gradually perfected in the course of practice." [56] Of course, "perfected" was susceptible to interpretations that could work against genuine reform. Nevertheless, the Fifth Plenum changed the policy context; SEZs would remain intact and liberalizing experiments revived.

The change of climate, from disdainful quiet to measured praise, was strikingly captured in a conference on zone policy held February 5–8, 1990. Li Peng, whose split with Zhao over coastal development had boded ill for SEZs, made a surprise appearance and "emphatically" endorsed zone policy. He remarked that SEZ "orientation is correct and the achievements are remarkable." [57] A front page commentary in *People's Daily* on February 9 was even more effusive, praising the "exuberant vitality" and "special superiority" of SEZs.[58] Zone policy was once again out of the political wilderness.

In certain respects, zone policy of 1988–1990 was consistent with past experience. SEZs completed another cylce of an established pattern of political-economc development, moving from expansion to retraction and back to openness. Oscillations in SEZ fortunes lead to two conclusions. First, the political basis of zone policy is unstable, and has been unstable for ten years. SEZs have consistently inspired ideological and economic criticism. When local or national conditions are seen as deteriorating, latent dissatisfaction is mobilized and SEZs confront formidable political threats. Although detractors have not mustered enough influence to close the zones, if they so desire, they have regularly been able to find ammunition for their assaults in the daily workings of SEZs.

Second, the cycles of SEZ political economy further suggest a dilemma for SEZ opponents. To the extent that they are technocrats interested in modernizing the country, skeptics cannot push too hard in centralizing and regulating zone administration. If they do, foreign investment, necessary for technocratic modernization, declines. SEZs are, therefore, not easily eradicated.

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[53] *Wen Wei Po*, August 23, 1989, FBIS, Ausgust 28, 1989, p. 67.
[54] *South China Morning Post*, August 25, 1989, FBIS, August 28, 1989, p. 51.
[55] *South China Morning Post*, November 1, 1989, p. 45.
[56] "CPC Central Committee Decision of Further Improving the Economic Environment, Straightening Out the Economic Order and Deepening Reform," FBIS, January 18, 1990, p. 36.
[57] Xinhua, February 9, 1990, FBIS, February 12, 1990, p. 23.
[58] FBIS, February 14, 1990, p. 16.

Two final points need to be made regarding the unique features of the 1988–1989 period. The introduction of considerable amounts of Taiwan capital is a break with the past. Especially in Xiamen, Taiwan investment boosted SEZ performance in 1988 and 1989. This plentiful source of fresh capital could bolster SEZs for some time to come. Second, the political crisis of spring 1989 was unprecendented for SEZs, as it was for all of China. It is, however, difficult to determine the economic impact of the violence on foreign investment in the zones. International businessmen were responding to the problems of austerity, which began before the crackdown, as well as to political repression. By contrast, the political effect of the Beijing massacre was more potent. Zhao Ziyang's fall and the weakening of zone policy repeated the cyclical pattern of SEZ development, establishing a new low point from which SEZs appear to be rising.

HONG KONG AND CHINA IN THE 1990s

By Kerry Dumbaugh [*]

CONTENTS

	Page
Introduction	858
Background	859
Economic Factors in Hong Kong-Chinese Relations	860
China's Stake in Hong Kong	860
Hong Kong's Special Connections with Guangdong Province	861
Changing International Investment Patterns	864
Political Factors in Future Hong Kong-China Relations	865
Changing Political Realities in China	865
Hong Kong's Evolving Political Environment	867
Other Issues	869
Emigration	869
Capital Flight	870
Implications and Conclusions	871

INTRODUCTION

The future of Hong Kong-China relations will be influenced by a range of economic, political, and social factors in which Hong Kong, China, and the international community are all important players. These factors include many variables that are neither discrete nor mutually exclusive. When considered together, they make it difficult to offer projections about the nature of future Hong Kong-China relations or the effect that China's resumption of sovereignty will have on Hong Kong. For the most part, however, the determining factors can best be assessed by posing four sets of questions whose answers will be the measures by which future relations will be judged, and the basis on which they depend.

1. What interests does China have in ensuring that Hong Kong's economy continues to thrive in the years leading up to and following 1997, when Great Britain formally cedes control to China?
2. What does China's political situation mean for how its promises on Hong Kong's autonomy will be translated into future actions?
3. As 1997 approaches and British influence wanes, how will Hong Kong's political infrastructure develop to take on the responsibilities of governance, and how will the new government interact with Beijing?

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4. How important will the "confidence" factor in Hong Kong be in affecting Hong Kong-China relations?

This paper will attempt to explore these questions by examining China's past attitudes toward and its economic and political stake in Hong Kong, exploring some of the economic, social, and political factors that have influenced Hong Kong's development to date, and analyzing new developments and trends that will be significant in helping to shape future Hong Kong-China relations.

BACKGROUND

Britain originally acquired Hong Kong's land area from China in three segments under the terms of separate treaties: the 1842 Treaty of Nanking, by which Hong Kong Island was ceded in perpetuity; the First Convention of Peking in 1860, by which Kowloon Peninsula and Stonecutters' Island were ceded in perpetuity; and the Second Convention of Peking in 1898, by which the New Territories were leased to Britain for 99 years beginning July 1, 1898. The latter treaty called for the New Territories—90 percent of Hong Kong's land area—to revert to China in 1997. It is under this treaty's terms that the British entered into negotiations with China to determine exactly how and when China would assert its claim to sovereignty.[1] Since the British government believed that those portions of Hong Kong ceded in perpetuity were not viable as an entity separate from the New Territories, the Sino-British Joint Declaration, which was formally signed on December 19, 1984, will formally restore to Chinese sovereignty and administration the entire area now governed by the British.

As the temporary government of an Asian country by virtue of a treaty with China, Great Britain has sought to justify its rule in Hong Kong on ideological or nationalistic grounds. Instead, justification of British governance has been based on performance—legitimized in part by its bureaucratic efficiency and by its willingness to play a restrained role in daily economic and social affairs. Also important has been the government's high level of administrative competence, its appearance of incorruptibility, and its ability to provide economic growth and development.

In the Joint Declaration and separately in various leadership statements, China has given detailed assurances that those elements of Hong Kong's current situation considered essential for its secure economic future—such as local administrative autonomy, convertibility of the Hong Kong dollar, British-style laws and institutions, and recognition of existing land rights—will be maintained for fifty years after 1997. Despite these assurances, Hong Kong residents have always been concerned about the impending takeover. In the post-Tiananmen Square era, many have increased doubts about whether current Chinese leaders have the ability or the will to follow through on the commitments spelled out in the Joint Declaration.

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[1] For a more complete discussion of Hong Kong's background and the details of the Sino-British negotiations, see Sutter, Robert. "Hong Kong's Future and Its Implications for the United States." *China's Economy Looks Toward the Year 2000.* May 21, 1986. S. Prt. 99-149, v. 2, pp. 371-384. U.S. Congress. Joint Economic Committee. Washington, U.S. Govt. Print. Off.

ECONOMIC FACTORS IN HONG KONG-CHINESE RELATIONS

CHINA'S STAKE IN HONG KONG

As a British colony, Hong Kong has become a thriving economic entity. Its economic success is partly a matter of geographical accident. Located at the hub of dynamic Pacific Rim economies, close to the China market, and blessed with a spectacular harbor, Hong Kong has had all the natural tools it needs to become an entrepot without other natural resources. An important addition to these endemic features has been the light hand of British administration, under which Hong Kong has enjoyed free port status and a favorable business climate which rewards incentive and nurtures entrepreneurship. Combined with Hong Kong's natural attributes, British administration has helped Hong Kong's indigenous population become among the wealthiest and the most skilled, efficient, and entrepreneurial in the world.[2]

Hong Kong's domestic economy has proven highly attractive to international corporations and investors. In 1989, $72 billion of Hong Kong's imported goods were retained for use within the territory. More than 900 U.S. companies and forty-four U.S. commercial banks have offices in Hong Kong, serving both the domestic and regional markets. Japan has over fifty banks and more than thirty securities firms in the territory. Total U.S. investment in Hong Kong in 1989 was estimated at $7.5 billion, a level surpassed for the first time in 1989 by Japan with an estimated total of $8 billion.[3] Hong Kong has attracted leading retail chains from Japan and Europe, and merchandising offices from major U.S. food and consumer goods manufacturers, all selling to the domestic market.

Measured by western standards of economic and political self-interest, China continues to have an enormous stake in assuring that Hong Kong remains a vibrant economy with the requisite economic freedom and ability to maintain its extensive and flexible international contacts. Hong Kong is currently China's third largest trading partner, and serves as China's major economic conduit to the rest of the world. By 1988, Hong Kong's trade with China had reached $37 billion.[4] The favorable balance of trade the PRC enjoys with Hong Kong provides from 30 to 40 percent of the former's foreign exchange earnings. In addition, 70 percent of external investment in China now comes from Hong Kong, both from indigenous Hong Kong enterprises and from the international community investing in China through Hong Kong.

The PRC also owns sizable percentages of important Hong Kong companies. These include 20 percent of Hong Kong Telephone and 12.5 percent of Cathay Pacific Airways. Chinese-backed banks attract up to 20 percent of total Hong Kong dollar deposits.

Also critical is Hong Kong's regional economic role and its importance as a doorway into the China market. Even absent its planned expansion, Hong Kong's container port is the largest in the world, handling 4.46 million twenty-foot container units in 1989. In addition, hundreds of companies from Europe, Japan, Korea, Taiwan, Australia, and other countries which operate in Hong Kong sell to China and to other countries and economies in Asia. Daily foreign exchange turnover in April 1989 averaged $49 billion. Hong Kong annually channels billions of dollars in international investment funds and manufacturing work to the PRC from Japanese, American, and European companies.

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[2] Hong Kong has the third highest per capita income in Asia, at $12,100 in 1990.

[3] Figures are from the American Consulate General in Hong Kong.

[4] See Dumbaugh, Kerry and Ipson, Michael. *The United States and Hong Kong's Future: Promoting Stability and Growth.* The National Committee on U.S.-China Relations. China Policy Series, No. Three, June 1990. p. 5. All figures in this report are cited in U.S. dollars unless specified otherwise.

Hong Kong is also viewed as an asset in promoting China's development. Chinese leaders in the post-Tiananmen era have continued to emphasize the need for modernizing and improving China's own economy, and have reiterated that China's open foreign policy will not change. These economic and foreign policy priorities appear to provide significant incentives for Chinese leaders to exercise restraint in their actions toward Hong Kong.

Despite these incentives for economic restraint, other factors may lead China to take actions which could prove detrimental to Hong Kong's freedom and economic strength. By 1989, China was facing its worst economic slump in a decade, largely due to economic austerity measures launched in 1988. Industrial growth has been weak and productivity has been low. Unemployment has increased, and the profitability of state and entrepreneurial enterprises has suffered. As a result, China's officially announced budget deficit had grown to a record level of $8 billion by the year's end. Should these economic difficulties continue, many are fearful that Chinese leaders may be tempted to divert profits directly from Hong Kong enterprises to bolster sagging national coffers.

Further, China's economically based incentives for restraint toward Hong Kong appear less persuasive when viewed in the context of China's own experience since 1949. The historical record demonstrates that the PRC's communist leadership has often placed ideological and political priorities above those which are economic or pragmatic. Thus some observers have always believed that Beijing's leaders will actively interfere in Hong Kong's economic decisions and manipulate its governing bodies. Others fear that some Chinese authorities intend to honor the country's commitments regarding political and economic autonomy but lack the abilities, experience, or tolerance needed to insulate Hong Kong from the political, economic, and bureaucratic dynamics of Chinese communist government. Some, who perhaps were beginning to have more confidence after a decade of Chinese reform under Deng Xiaoping, point to the Tiananmen Square crackdown as proof that China's communist leaders are unable to provide a consistent and reliable policy environment, whatever their intentions or abilities.

HONG KONG'S SPECIAL CONNECTIONS WITH GUANGDONG PROVINCE

An important element in the last decade of Hong Kong's success, and of significant potential in Hong Kong-China relations, is the substantial link which the territory has developed with South China, particularly in Guangdong Province. Separate entities in the late 1970s, Hong Kong and Guangdong are now economically intertwined. Most of these economic links have occurred after the Sino-British Joint Declaration and in spite of policy shifts and economic downturns in China. Economic alliances and personal connections already have permeated and considerably transformed the Hong Kong-Guangdong relationship, providing mutual benefit.

The Hong Kong-Guangdong border now appears readily permeable. As many as 10,000 commercial vehicles and thousands of business commuters cross the border daily. The two regions have collaborated on major infrastructure projects, including electric power plants, transportation systems, hotels, restaurants, and factories. Many of these projects have involved Hong Kong construction companies and workers. Importantly, many ongoing and completed projects involve continuing Hong Kong management expertise. Hong Kong Polytechnic and other educational facilities have become major training centers for Guangdong personnel, teaching Western business and management practices to Chinese managers. According to one observer, most Guangdong business endeavors are now calculated in Hong Kong dollars rather than the PRC's renminbi.[5]

For its part, Hong Kong's connections to Guangdong have contributed greatly to its own growth. Despite the uncertainties accompanying impending Chinese rule, Hong Kong, constrained both by limited space and a limited and increasingly expensive labor force, has moved decisively to capitalize on the new relationship. A substantial number of Hong Kong's outprocessing centers have been moved to Guangdong Province in the last decade—as much as 18.4 percent of Hong Kong's small and medium industries by 1987, according to one sample survey.[6] In the last eight years, Hong Kong's toy industry has nearly doubled in size, with virtually all of this growth coming from China.[7] By 1988, according to one estimate, Hong Kong manufacturers directly employed two million people in Guangdong.[8]

Guangdong's geographic proximity, virtually limitless labor supply, substantially lower wage rates, and overall lower costs of production have bolstered Hong Kong's international competitive advantage. Hong Kong's special access to Guangdong—and through Guangdong, to China—has increased its attractiveness to foreign businesses anxious to benefit from Hong Kong's export advantages and gain greater access to China's domestic market.

Nor are these benefits one-sided. In the last decade, Guangdong Province, a key success story in China's modernization program, has achieved spectacular growth rates—15.9 percent in 1989, according to one report, a rate which compares favorably with that achieved by Japan in the early 1950s, Taiwan in the late 1950s, and Korea in the early 1960s. Moreover, in achieving this growth rate, Guangdong has had to overcome challenges not faced by these countries. As part of communist China, Guangdong labored under greater economic and political constraints than did these dynamic

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[5] According to Mark Pratt, former U.S. Consul General in Guangzhou, PRC.

[6] See Sit, Victor F.S. "Industrial out-processing in Hong Kong's new relationship with the Pearl River Delta." *Asian Profile.* v. 17, February 1989, p. 6.

[7] Hong Kong is the world's largest toy exporter, with about half of those exports going to the United States. Hong Kong's toy industry grew from HK$9 billion in 1982 to HK$16 billion by September 1987. Source: Hong Kong Trade Development Council.

[8] This was the estimate of China's Xinhua News Agency, which serves as the de facto Chinese representative in Hong Kong. Cited in Vogel, Ezra. *One Step Ahead in China. Guangdong Under Reform.* Harvard University Press, Cambridge MA, 1989. p. 442.

Asian economies. In addition, the province was not favored with large amounts of foreign aid, and was confronted with an international trading environment decidedly less favorable to the kind of export-driven growth which had contributed to Asian economic success in earlier years. Its proximity to Hong Kong, however, gives Guangdong a special asset. Guangdong has benefited from Hong Kong's high general management skills, well-developed financial and services sectors, and the excellent information network which has enabled Hong Kong to respond rapidly to changing conditions in overseas markets.

The spectacular growth and interconnectedness of the Hong Kong-Guangdong relationship raises important considerations for the future of Hong Kong-China relations, since their ties are an essential element to their decade of growth. Its connections with Hong Kong have given Guangdong the economic advantages to become China's most successful export province (it accounts for 18 percent of national export totals). Likewise, Guangdong's connection with Hong Kong continues to present Beijing with the primary source for the international capital so essential to China's economic modernization goals. This status not only assures Guangdong's continued importance in China's economic reform and modernization programs, but could also increase its growing economic and political influence with—and even autonomy from—Beijing. Thus Guangdong officials could find it in their interests to act as interlocutors in Hong Kong's dialogue with Beijing, augmenting Hong Kong's own voice and perhaps compensating for whatever weaknesses may remain in Hong Kong's indigenous political infrastructure. To an extent, mutual economic self-interest and contacts may even transcend the PRC's political goals and jurisdiction.

But Hong Kong's interdependence with Guangdong also has a darker side. To the extent that they are mutually dependent, each has become more vulnerable to economic and political conditions in the other. Swift economic growth in Guangdong has outstripped the province's infrastructure, power generation capacity, and transportation facilities, thus limiting its current potential for economic growth. Although local officials throughout Guangdong are reported to be planning a number of new infrastructure projects to redress these limitations, such projects may prove ill-founded and wasteful if they are not coordinated at the provincial or even central levels of government. Economic interdependence also means that any tightening of economic restrictions in China which affects Guangdong could have repercussions for Hong Kong's economy, even if not directly aimed at Hong Kong. Continued economic difficulties in China could cut the demand for Guangdong products in China's domestic market, resulting in lower revenues for the province and for Hong Kong investments there. Changes in Guangdong Province's leadership or policies, in its influence with Beijing, or in the level of Western investments there could also adversely affect Hong Kong. Likewise, economic setbacks in Hong Kong could erode its ability to attract the foreign business investment funds so essential to Guangdong's growth, a situation which ultimately could prompt Chinese leaders to reassess the province's role in national economic and modernization plans. Economically, the Hong Kong-

Guangdong connection thus holds both great promise and potential difficulty for future Hong Kong-China relations.

The PRC's credibility in its policy of "one country-two systems" is totally dependent on whether Hong Kong does well, and the consequences for China's economic and political relations with Taiwan and with the world are considerable. If China's dual approach succeeds, if Hong Kong "does well," then not only does China derive economic benefit from its financial stake in Hong Kong, but Taiwan and the international community may be encouraged to foster more rapid and extensive economic ties with other autonomous regions in China. In Taiwan's case, the development of more extensive economic relations could, in time, lead to some mutually acceptable settlement of the "Taiwan question."

CHANGING INTERNATIONAL INVESTMENT PATTERNS

Perhaps the murkiest set of factors in future Hong Kong-China relations involves international economic interests in the region. Hong Kong's extensive economic links with the international community mean that its potential for future growth will depend greatly on continued international willingness to invest. Measures of international investment can be unreliable, making it difficult to draw firm conclusions about the extent of international business confidence in and commitment to Hong Kong based on investment decisions. In addition, international governments and business enterprises undoubtedly will base future investment decisions on their perceptions of other determinants and variables affecting Hong Kong's future, making projections even more problematic.

Estimates over the last few years indicate that major investor countries continued to increase their levels of investment in Hong Kong Kong through 1989. U.S. investment is estimated to have grown from $4.5 billion in 1986 to an estimated $7.1 billion in 1989, while Japan's is estimated to have grown from $4.6 billion to $8 billion during the same period.[9] In the eighteen months since June, 1989, consortia involving major U.S., Japanese, and European concerns have invested in development projects and have successfully bid for contracts to build Hong Kong's cable television network.[10] During the same period, multinational firms, including U.S. companies, have been awarded contracts for pieces of Hong Kong's mammoth airport and port terminal construction projects.[11] U.S. and Japanese concerns also are part of a loan syndicate granting a $1.35 billion loan to Hong Kong International Terminals for the construction of two new container terminals. These huge infrastructure projects, which are in their initial stages, will continue to provide U.S. contractors and other international firms with billions of dollars in investment opportunities.

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[9] Figures provided by the American Consulate General in Hong Kong.

[10] In July, 1989, the U.S. Citibank corporation took a 10 percent stake in the largest development site ever sold in Hong Kong's Central Business District. U.S West was part of a consortia that has successfully bid for Hong Kong's cable television system—at $700 million, estimated to be the largest in the world.

[11] The U.S. firms of Bechtel and Morgan Stanley are now the project manager and overall financial advisers for the project, respectively. Another U.S. company, Greiner Engineering, in partnership with a Hong Kong company, will produce the new airport's master plan.

Although the current international investment attitude toward Hong Kong itself appears to remain healthy, international investors doubtless have longer-term concerns that will influence investment patterns. The recent growth in Hong Kong investments in Malaysia and Thailand may be due partly to pressure from U.S. and other international customers for diversification of Hong Kong manufacturing capabilities away from locations in China in order to assure reliability of supply. Continuation of such pressure could act as a brake on Hong Kong's economic connections with Guangdong and with the rest of China, and could encourage further diversification by Hong Kong enterprises.

The ability of international business to exert influence over Hong Kong business decisions has the potential for dramatically changing current investment patterns in South China and Hong Kong. Such a change offers opportunities and drawbacks. On the negative side, it could limit Guangdong's profitability and possibly erode its importance in—and thus its influence over—China's ongoing modernization goals. International pressure for diversification of Hong Kong industries could also fuel concerns among Chinese leaders about the "internationalization" of Hong Kong, prompting efforts by Beijing to assert more control over the territory's capital flow and investment decisions. But on the other hand, continued diversification of investments could increase the ability of Hong Kong businesses to weather economic and political climate changes in Beijing.

POLITICAL FACTORS IN FUTURE HONG KONG-CHINA RELATIONS

CHANGING POLITICAL REALITIES IN CHINA

Since the 1989 Tiananmen Square crackdown, most reporting and analysis on conditions in China have been understandably downbeat and generally negative.[12] The reassertion of power by elderly and supposedly retired leaders demonstrated that power in China remains more personal than institution-based, increasing the likelihood of future divisive power struggles as these aged leaders die, and making projections about China's future policies even more problematic. Factional infighting appears to go to the very top of the Chinese leadership. Reformers are seen to be at odds with more conservative-minded leaders like Chen Yun and Yang Shangkun who are judged to be pressing for limits on reform and reversal of key economic and political changes of the last decade. There has been no clear consensus among leaders on many issues and little definable policy vision. The result has been gridlock in Chinese decisionmaking, and a policy process whose future directions and mechanisms remain uncertain.

Chinese leaders now face serious political, economic, and social challenges. At the end of the Long March generation, Chinese authorities are confronted by widespread disaffection with the Communist Party, increasing social pressures for meaningful change in the political system, weakened central government authority, and a whole host of increasingly intractable economic troubles. These difficulties come at a time of upheaval in the Soviet Union and Eastern Europe, with world socialism in serious decline, fueling disagreements in Beijing about the viability of China's chosen socialist path. These changing political realities pose new perspectives and challenges for China's resumption of sovereignty over Hong Kong.

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[12] Typical of the bleak projections for China was the most recent CIA annual assessment China's economy. See *The Chinese Economy in 1989 and 1990: Trying to Revive Growth While Maintaining Social Stability*. A report by the Central Intelligence Agency. Presented to the Subcommittee on Technology and National Security of the Joint Economic Committee. June 28, 1990.

Perhaps the most meaningful development within China has been an increase in regional authority at the expense of central governmental authority. With a central government unable to articulate and pursue effective national policies, local and provincial officials—already given increased authority and functions during the reform decade—appear to have gained further power and influence. In 1990, regional power was such that provincial authorities appeared able to influence and help craft important reform provisions in China's new Five-Year plan.[13] In the absence of a renewed consensus in Beijing or the emergence of a strong political center—events seen as unlikely in the near or even medium term—central government authority is likely to continue to weaken while regional authority grows. This being the case, events in Beijing, although politically significant, may be increasingly less important for the daily economic affairs of the rest of the country.

In such a world, Hong Kong's autonomy from Beijing may be more assured, at least by default, than could have been envisioned in 1984 when the Joint Declaration was signed. Guangdong Province, an economic success in China's modernization program, already possesses significant economic and even political autonomy from Beijing. A weak government in Beijing could allow Guangdong to be pulled farther away from central Chinese control and increasingly into Hong Kong's orbit. With this mutual political reinforcement, with extensive economic and personal interconnections, and with revenues economically essential to stated goals of national development, the Hong Kong-Guangdong combination could enjoy influence in Beijing significantly greater than either entity could command separately.

On the negative side, problems may arise from the reform policies which have given coastal regions and Special Economic Zones (SEZs) special benefits and resources. Widening regional financial and infrastructural diversity in China has produced strains which have spawned inter-provincial protectionist measures and conflicts over resources. According to some reports, for example, resources bound for Guangdong, a favored province, have been assessed extra duties at various points en route.[14] In the past, regional tensions have been such that Guangdong officials may be tempted to keep a lower profile in the future to avoid provoking jealousy among other regions and provinces. Weak central government could exacerbate these tensions by diminishing Beijing's ability to be an arbitor of regional conflicts. Hong Kong, as an economically vital and advanced entity with strong connections to Guangdong, could easily become a target of such tensions. Moreover, a stronger central government in Beijing headed by more conservative leaders could seek to target Guangdong and other more market-oriented provinces for greater socialist discipline and economic restrictions.

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[13] Provincial influence appeared to be key in Beijing's decisions to retain the contract system which permits provincial government and state enterprises to keep profits exceeding agreed-upon remittances to the central government.

[14] Information provided by Mark Pratt, former U.S. Consul General in Guangzhou, PRC.

A second potentially negative effect of China's changing political realities concerns the investments of China-backed businesses in Hong Kong. In the mid-1980s, Chinese enterprises began investing in Hong Kong, anxious to capitalize on the territory's wealth and take advantage of the impending resumption of sovereignty. Some ill-founded ventures failed due to lack of accountability for financial and management mistakes, thus hurting Hong Kong enterprises and fostering lack of confidence among investors contemplating ventures with Chinese companies. Although Beijing has responded to these failures by placing restrictions on new Chinese investments in Hong Kong, it remains unclear how effectively a politically and economically weakened central government will be able to exercise control over future investment decisions. Should Chinese enterprises continue to invest in Hong Kong, Beijing may have to muster enough will and revenue to assure their accountability or financial solvency. Absent such assurance and financial backing, Chinese companies could find it more difficult to attract future customers for their Hong Kong ventures.

HONG KONG'S EVOLVING POLITICAL ENVIRONMENT

Hong Kong has never experienced comprehensive democracy, political autonomy, or a decisive power to determine its own political fortunes. Nevertheless, its citizens and business enterprises have enjoyed great personel and economic freedom, and the territory has benefited from being governed by an enlightened western country with assets that the PRC cannot claim. These include a long history of governmental consistency, an extensive international economic and political presence, and a sophisticated industrial and financial base. Yet, this near-century under British administration has been a two-edged sword. On the one hand, it has provided Hong Kong with the luxury to pursue commerce almost exclusive of other concerns, and with spectacular success. But it also has limited the ability of its people to acquire experience and skills they may need in assembling a sufficient political tradition and infrastructure to put "a high degree of autonomy" into practice. Complicating this issue, there is general concern that the influence and effectiveness of a "lame duck" British government in Hong Kong will wane as 1997 approaches. The future of Hong Kong-China political relations will depend in part on Hong Kong's ability to form an indigenous political infrastructure with strong popular backing, first class administrative abilities, and sufficient skill and authority to represent Hong Kong's interests effectively in Beijing.

Hong Kong's political elite continue to be divided in their views about the desirable pace and extent of Hong Kong's political transformation. In particular, there is continuing disagreement over the amount of accommodation that should be reached with Beijing, with some favoring a cautious approach that adjusts more to Beijing's wishes and others pushing for a more assertive approach in an effort to maximize Hong Kong's autonomy. Continued lack of unity could stall Hong Kong's momentum toward establishing a stronger political infrastructure. A further difficulty is the apparent political apathy of the populace-at-large. With some exceptions, Hong Kong's population has remained difficult to mobilize on political issues, raising questions about the extent to which they will be able to contribute to the political process.[15]

These problems have been particularly apparent in the case of Hong Kong's attempts to conduct legislative elections. Hong Kong's new Basic Law, approved in 1990, will serve as the Hong Kong SAR's constitution, and provides for the first direct elections of the Legislative Council (Legco).[16] The Basic Law provides for 18 of the 60 members of Legco to be directly elected in September, 1991.[17] In the wake of the Basic Law's approval, fledgling political parties and groups in Hong Kong have proliferated in preparation for the 1991 elections. None of the new groups has yet attracted sufficient membership or support to seize the political high ground. Although a number have similar platforms and goals, they have not yet merged or united their efforts in an attempt to gain political strength, increasing the likelihood that candidates representing similar constituencies will be running against each other in September.[18] With the political situation in Hong Kong still evolving, the atmosphere for coming elections remains uncertain. Despite the large number of political parties that may field candidates, some Hong Kong officials have expressed concern over whether there will be enough qualified candidates running, to the point where several prominent officials have made public appeals for participation.[19] Even if the transition to an indigenous government is smooth, its ability to govern remains unclear. If government is perceived to be weak, Hong Kong businesses, international investors, and other interest groups in Hong Kong may seek to deal directly with Beijing, bypassing Hong Kong government processes and further undermining governmental authority.

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[15] Two notable exceptions were the large demonstrations in 1989 after the Tiananmen Square crackdown and a campaign which garnered over one million signatures opposing China's plans to build the Daya Bay nuclear power plant near Hong Kong.

[16] The Basic Law was the work of the Basic Law Drafting Committee (BLDC), comprised of Chinese and Hong Kong members formally tasked with drawing up the political model for post-1997 Hong Kong. The Basic Law was approved by the BLDC on February 16, 1990, and promulgated by the National People's Congress in April, 1990.

[17] This figure is considerably higher than the number directly elected under British administration (zero), but is significantly lower than the number some in Hong Kong supported (as high as 30). Under the Basic Law, the number of directly-elected officials will rise to 20 in 1995, seen as a concession by Beijing, which favored limiting directly-elected members to 18.

[18] Among the new political groups are four judged to be politically liberal—the United Democrats of Hong Kong (UDHK), the Hong Kong Association for Democracy and Peoples' Livelihood (HKADPL), the Meeting Point, and the Hong Kong Affairs Society (HKAS)—and several probusiness organizations considered to be moderate—the Hong Kong Democratic Foundation (HKDF), and the Liberal Democratic Federation (LDF). These groups join existing political organizations such as Reform Club and the Civic Association.

[19] Among those making such appeals have been Hong Kong's Governor, Sir David Wilson, and Lady Lydia Dunn, a senior member of Hong Kong's Executive Council (Exco). For further discussion of the formation of political parties, see *Far Eastern Economic Review*. "Peking's tune." August 23, 1990, p. 22.

OTHER ISSUES

EMIGRATION

Apart from economic and political issues, more elusive indicators in future Hong Kong-China relations show a confidence problem whose severity and direction is difficult to predict. Chief among these problems, and of most concern to Hong Kong, is the increasing emigration rate of skilled personnel. An estimated 62,000 persons emigrated in 1990—a 50 percent increase over 1989—most of these among Hong Kong's most skilled and educated citizens. This creates a number of problems for Hong Kong's future. First, it robs the territory of its primary resource in attracting international business—the highly skilled, talented, and ambitious among its population, or the very people Hong Kong needs to maximize its continued economic vitality. The demographic makeup of emigres appears to have changed since the Tiananmen Square crackdown, shifting from older, wealthier citizens to younger middle-management families with school-age children, who form the core of Hong Kong's skilled work force. Emigration of personnel also deprives Hong Kong of the human resources it needs to assure its traditional highly efficient services sector, such as in the civil service, which has helped make the territory run smoothly.

There appears to be no consensus, either within the Hong Kong government, the Hong Kong business community, or the international community about potential solutions to Hong Kong's emigration worries.[20] Hong Kong managers will undoubtedly have to accept the inevitability of losing personnel, and may consider replacing departing employees by hiring PRC citizens or expatriates and citizens from other countries who have no future citizenship worries. But such measures, while possibly helping to maintain Hong Kong's efficiency and economic vitality, raise other concerns. Replacement of Hong Kong personnel with citizens from other countries may exacerbate Beijing's concerns about the "internationalization" of Hong Kong, particularly since such employees would owe no allegiance to China and would complicate Beijing's authority over them. Replacing emigrating personnel with PRC citizens may exacerbate Hong Kong's sensitivity to a "takeover" by mainlanders who may have little concern for Hong Kong's autonomy.[21]

Informal Hong Kong polls indicate that many foreign and Hong Kong-owned businesses in the territory stand to lose a large percentage of their middle and upper management work force before 1997. Sixty percent in the computer industry was one figure cited.[22] This could pose challenges for China, which will inherit the consequences of whatever erosion of efficiency and vitality accompanies Hong Kong's loss of skilled personnel. Observers have pointed out that Chinese leaders appear to be unconcerned about keeping talented professionals in Hong Kong. According to some sources, Beijing authorities are reported to have said that those who wanted to leave Hong Kong should do so now—an attitude which has not inspired confidence and which seems to discount the importance of qualified personnel in creating and sustaining a vibrant economy, and exacerbating concerns about the future.[23]

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[20] Within the business community, for example, opinion is divided on such basic points as whether Hong Kong employers should help their employees gain foreign residency status or encourage them to stay in Hong Kong in order to assure the territory's economic health. Thus there is no agreement on whether countries such as the United States should provide Hong Kong residents with passports, residency permits, or special delayed-action visas that would provide an option to leave later. Britain's decision to grant right of abode to 50,000 Hong Kong families (estimated to translate into 250,000 people) is controversial for this reason, among others.

[21] In September 1990, the Hong Kong government eased its former restrictions on hiring Chinese nationals. Under the old law, Chinese nationals could be hired by Hong Kong companies either if they were sponsored by a mainland company operating in the territory or by applying for an immigrant visa. The new law permits Chinese nationals who have resided overseas for at least the previous two years to apply directly to private-sector companies for employment.

CAPITAL FLIGHT

Related to the emigration question are concerns about capital flight. Since the Hong Kong government does not publish balance of payments figures, measuring capital flows in the territory is an impressionistic undertaking. Nevertheless, some financial reports, such as the Hong Kong and Shanghai Bank's monthly report, suggest that capital outflow is a problem, and that it may have exceeded HK $32 billion in 1990.[24] Hong Kong government officials have admitted that there has been a recent increase in borrowing in Hong Kong dollars for the purposes of financing overseas investments, primarily in Indonesia, Thailand, and Malaysia; in the first quarter of 1990, Hong Kong projects approved by these three countries increased by more than 200 percent over previous rates.[25] At the same time, China's Ministry of Foreign Economic Relations and Trade (MOFERT) reported that the pace of Hong Kong investments in China had slowed. If these projections are correct, it suggests that some Hong Kong companies may be reassessing the costs of doing business in China.

Although the timing of these shifts in investment patterns suggests that the Tiananmen Square crackdown is a significant factor, other related variables may be at work. U.S. imports from Malaysia, Indonesia, and Thailand receive low tariff rates or duty-free status under the U.S. generalized system of preferences schedules (GSP). This favorable tariff treatment is denied to products imported from Hong Kong and China. Moreover, U.S. willingness to continue giving most-favored-nation status (MFN) to products imported from China has remained in doubt since the Tiananmen Square crackdown.[26] Loss of this status would significantly increase the U.S. prices for Hong Kong imports manufactured in China—in some cases, by as much as 90 percent. In addition, some reports have indicated that Hong Kong businesses and international investors may have started to become more cautious about their China investments as early as 1988, when Beijing launched its austerity drive and tightened credit.[27] Still another factor may be Hong Kong's increasing shift over the last decade from producing cheap, labor-intensive goods, where China's unlimited labor pool and low costs provide advantages, to producing higher-value technological goods which require a more skilled work force. Although most Hong Kong manufacturing firms are small firms producing labor-intensive goods—companies that should continue to lean on the competitive advantages Guangdong offers—the trends suggest that larger companies with more financial resources and greater mobility will be seeking to diversify their production bases.

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[22] This was among the figures cited at a conference in Hong Kong sponsored by the National Committee on U.S.-China Relations on March 29-30, 1990.

[23] See Dumbaugh and Ipson, p. 8.

[24] The Hong Kong and Shanghai Bank recently announced the formation of a holding company which will be incorporated in London. The institution denied that its decision related to concerns for Hong Kong's economic future. The Bank itself will remain in Hong Kong, and the holding company will be managed from Hong Kong.

[25] Jiang, Frank. "Fresh pastures." *Far Eastern Economic Review*. September 20, 1990, p. 92.

[26] MFN status, while higher than the GSP rates given to developing countries, is still considerably lower than non-MFN duty rate schedules. In 1990, the U.S. Congress considered legislation which would have denied or restricted China's MFN status, and may consider such legislation again in 1991.

IMPLICATIONS AND CONCLUSIONS

The nature of future Hong Kong-China relations will have profound implications for Hong Kong and for Chinese domestic and foreign policy. In the past, Chinese leaders have legitimized their rule primarily on ideological or moralistic grounds. But Hong Kong citizens are likely to judge the legitimacy of Chinese communist rule almost entirely on the basis of performance. And China's "performance" in Hong Kong will be measured largely by how Hong Kong performs throughout the 1990s. In Hong Kong's case, "performance" for the most part means providing an economic environment which continues to foster growth and an effective, incorruptible government capable of delivering efficient services and benefits to the people.

Domestically, China's performance in Hong Kong has far-reaching political implications. In recent years, China's party leaders and government officials have faced increasing public criticism about their administrative abilities, particularly their ability to provide efficient government, pursue effective and consistent policies, and control bureaucratic corruption. At the beginning of the 1990s, the credibility of the Chinese Communist Party has been significantly eroded by the Cultural Revolution and further damaged by the Tiananmen Square crackdown. Events in Europe and the Soviet Union have raised important questions about the very viability of socialism. Hong Kong arguably provides Chinese leaders with opportunities to recapture their lost legitimacy. Some consider that they have an opportunity to demonstrate that socialism and central planning can work side-by-side with capitalism and market mechanisms for mutual benefit. They have an opportunity to demonstrate their tolerance for diverse economic and political systems within a single socialist construct. A poor performance in Hong Kong, however, could further and perhaps irrevocably damage Beijing's mandate to rule under existing socialist theories and leaders.

China's performance in Hong Kong has equally far-reaching foreign policy implications. In the last decade, including the post-Tiananmen Square era, leaders in Beijing have steadfastly maintained that China will continue to "open to the outside world," and will continue to seek the foreign investment so important to China's modernization program. Nevertheless, China's international business contacts have been constrained by limited transportation and energy infrastructures, bureaucratic difficulties, and lack of an appropriately skilled work force. In Hong Kong, however, Chinese officials and enterprise managers will be coming into intimate and ongoing daily contact with foreign governments and business enterprises. China can benefit greatly from this vast network of international connections, advanced infrastructure, and highly skilled labor force. On the other hand, the extensive international presence in Hong Kong also provides innumerable opportunities for confrontation between China, other governments, and multinational businesses. A poor performance could adversely affect international views about the abilities of Chinese leaders to govern or about China's own commitments to pursue economic efficiency and progress.

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[27] Jiang, p. 93.

To a great extent, the measure of China's performance in Hong Kong will be burdened by Hong Kong's own past success. Nevertheless, in assessing the future of Hong Kong-China relations, it would appear prudent to avoid extremes, and to remember the wide array of variables that will influence the relationship.

CHINA'S ASIAN TRADE

By John Frankenstein *

CONTENTS

	Page
Summary	873
I. China's Asia Trade	875
II. The Major Players	875
Japan	876
Hong Kong	878
Taiwan	880
South Korea	882
III. ASEAN	883
IV. Other Asian Players	884
V. Commodities Traded	886
VI. Opportunities and Dilemmas	889

TABLES

1. China's Asian Trade, 1980–89	876
2. Japan and Hong Kong Two-Way Trade with China, 1982–89	877
3. Sino-Japanese Trade, by Commodity, 1988	878
4. Shares of Contracted Foreign Investment in China, 1979–89	878
5. Taiwan Trade with PRC via Hong Kong, 1984 and 1989	881
6. China's Trade with ASEAN, 1980 and 1989	883
7. China's Trade with India and Pakistan, 1981, 1983, 1989	885
8. Percentage Structure of Chinese Merchandise Export, 1965 versus 1987	886
9. Top Fifteen Chinese Exports, by Percentage of Total Export Value, 1987–89	888
10. Top Fifteen Chinese Imports, by Percentage of Total Import Volume, 1987–89	889
11. Top Five Chinese Imports, by Country of Origin, 1989	890
12. Top Five Chinese Exports, by Country of Destination, 1989	891

SUMMARY [1]

During the decade of the 1980s, and the Deng reforms, China's trade with Asia grew substantially, surpassing world trade growth trends. China trades more with Asia than with any other region.

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[1] Notes on data sources: Unless otherwise noted, the figures presented here are based on the *Direction of Trade Statistics (DOTS) Yearbooks* (International Monetary Fund, Washington, D.C.) for 1986 and 1989. The 1989 trade figures on China are taken from *Business China*, April 1990. Hong Kong indirect trade figures are taken from the continuing series of Hong Kong government statistics resented in the monthly *China Trade Report (Far Eastern Economic Review*, Hong Kong). Other sources will be noted as appropriate.

There are some important substantive and methodological caveats about the data. DOTS is based on official data reported by governments. These data vary in quality and coverage. For instance, trade data reported by China simply lists the first destination of the commodity

Continued

However, the trade is highly concentrated with Japan and the Newly Industrializing Countries (NICs) of Hong Kong, Taiwan, South Korea and Singapore—all but 10% of China's Asian trade is with this group. Of these countries, Japan and Hong Kong dominate. Japan leads in technology trade. Hong Kong is especially important because of its entrepôt intermediary function; Hong Kong's economy is tightly linked, through trade and investment, with South China's. Trade and investment with Taiwan and South Korea have grown [2] dramatically over the past several years and will continue to expand.

Trade with ASEAN (Association of Southeast Asian Nations) is modest, despite recent Chinese political gains in the region—both ASEAN and China are more concerned with trade with the major capitalist countries than they are with each other. Trade with South Asia is minor because of unpromising economic conditions, political conflict, and inward-looking policies.

China's trade with Asia is likely to take on more importance as the PRC deals with the political fallout of Tiananmen in the West. However, because of different strategies, the gap in economic development is widening between China, which follows habitual Stalinist planning policies, and her major Asian trading partners, which are building up exports and technology. How China deals with the absorption of Hong Kong in 1997 will be crucial to the further development of China's trade and economy.

In 1989 China's exports were valued at $52.5 billion, up 177% from the beginning of the decade, for an annual growth rate of 11.9% China's import growth was even more rapid: in 1980 China's total imports were valued at $18.1 million, reaching $59.1 billion in 1989, an overall increase of 226% between 1980 and 1989 at an average annual rate of 14.1%.

It is important to note that these figures are quoted in current dollars, unadjusted for inflation or exchange rate fluctuations. But one can gain a sense of the size of China's trade on an annual basis. Between 1980 and 1988, the PRC's share of world exports grew by less than 1% annually, going from 1% in 1980 to 1.8% in 1988. For the same period, the industrialized world's share went from 67.7% to 71.6%, Asia's share from 8.1% to 12.6%, and the

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traded; data reported by the United States counts country of origin. Thus the DOTS China table shows Chinese exports to the United States in 1988 to be U.S. $3.39 billion, but the U.S. table shows imports from China to be U.S. $5.04 billion; the difference lies in transshipments through Hong Kong and elsewhere.

[2] Furthermore, the data do not include trade in services ("invisibles" such as receipts from tourism or labor exports), these figures omit investment flows, are selective in what is counted (arms transfers are often not included) and, of course, leave out data on what economists politely call the "informal economy," which in the Asian case can be rather important.

More specific to the PRC, DOTS follows official accounts and thus omits trade numbers from Taiwan or South Korea, and does not deal with the complex issue of indirect trade via Hong Kong—for these areas the discussion draws from additional sources as noted above and combines them as appropriate with the DOTS data.

It should also be noted that the DOTS figures are in current dollars—while these figures reflect significant growth, for truly comparative purposes one needs to compute a constant dollar value. Fluctuations in the official exchange rate, significant differences between official and "market" (grey or otherwise) exchange rates, varying and officially understated inflation rates, and lack of market pricing for Chinese goods all combine to make that calculation problematic. Adding to the problem, in keeping with international practice, DOTS reports exports on a f.o.b./f.a.s. basis and reports imports on a c.i.f. basis.

In sum, it must be admitted that there are significant issues of consistency and compatibility. The data are primarily useful to us in providing trends and approximations, the big and the short-term picture.

"Four Dragons" share (Hong Kong, Taiwan, Singapore, and South Korea), which accounted for 4.5% of world exports in 1980, rose to 7.2% in 1988. None of this should be taken to disparage China's trade program, but in any discussion of international commerce, it is useful to have some reference points.

The numbers reflect not only the growth of world trade, but also the superior performance of Asia, particularly the export-oriented Newly Industrializing Countries (NICs) of Asia or "Four Dragons," in that trade. While in the total scheme of world trade China's share is modest, dwarfed by the major industrial powers, its trade growth exceeds that of trade-shy India's by more than a factor of two—the only Third World country outside the NICs with which comparisons are meaningful. In terms of volume, by the end of the decade China ranked with countries such as Spain (in the European context, an NIC) and Switzerland. At the same time we should note—and certainly the leaders in Beijing are not ignorant of this—that the Asian NICs, given their much smaller population and resource bases, are outperforming the People's Republic of China.

I. CHINA'S ASIAN TRADE

Given these global and regional numbers, it is not surprising to see that over the same period, Chinese trade with the Asian region expanded both in absolute and relative terms. Taken as a region, China trades more with Asia than with any other area (see table 1).

China's two-way trade with Asia grew 263% between 1980 and 1989 at an annual rate of 15.4% per year, outstripping Chinese trade growth as a whole. As a proportion of total Chinese trade, China-Asia trade went from 45% in 1980 to 55.8% in 1989; indeed, China's Asian trade has consistently exceeded 50% of total trade since 1984. Furthermore, China's Asian trade as a whole from 1980 to 1989 has been in positive balance, easing a cumulative trade deficit of U.S. $44.06 billion. In other words, China's trade with the Asian region makes up a very important part of the overall Chinese trade picture. But that trade is not evenly distributed across the region—quite the contrary, it is highly concentrated and, one might argue, distorted.

II. THE MAJOR PLAYERS

The economic powerhouses of the region—Japan and the NICs—account for all but about 10% of that trade. Of these trading partners, Japan and Hong Kong are by far the most important, as table 2 shows.

One can get a sense of how these two trading partners have dominated China's trade by observing over the 1982–88 period, during which Japan and Hong Kong together accounted for annual averages of 45% of China's total trade and 86% of China's Asian trade. Certainly one would expect that Japan, for a multiplicity of reasons—sheer economic power, geographic proximity, well-managed business strategies, financial penetration and concessions, etc.—would play a major role in China's foreign economic relations.

Table 1
CHINA'S ASIAN TRADE, 1980-88[a]

Year	Asian Trade (U.S. Millions of current dollars)		Asian Exports	Asian Imports
	Exports	Imports	As % of total	As % of total
1980	10,160	6948	56.0	35.6
1981	12,464	8751	58.0	40.5
1982	12,299	6707	56.2	35.4
1983	12,430	8373	56.3	39.3
1984	14,707	12,176	59.2	46.9
1985	16,995	21,549	62.2	50.7
1986	17,851	20,068	56.9	46.4
1987	23,801	21,148	60.3	48.9
1988	30,703	26,857	64.4	48.5
1989	34,878	27,381	66.5[b]	46.3[b]

a. Cumulative balance + = U.S. $26.34 billion
b. Taiwan and Korea direct trade not included in 1989

JAPAN [3]

Although Sino-Japanese trade was relatively balanced from the mid-1970s to the mid-1980s, Japan began to run massive surpluses in the trade as China relaxed import and foreign exchange controls in 1985. In 1984 the surplus was U.S. $3.1 billion; in 1985, out of U.S.$21.3 billion total trade, the Japanese surplus was $9.1 billion. While Chinese import controls have tightened substantially since 1985, and Japan's positive balance has been cut, Japan still is in the black in the relationship (down to U.S. $3.1 billion in 1988 and U.S. $2.2 billion in 1989).

Japanese skill in the China trade is enhanced by "triple-teaming" collaboration between trading companies (the sogo shosha), which provide the market penetration; manufacturers, which supply the appropriate goods; and banks, which provide attractive financing. Concessionary loans add to the picture—for instance, in 1990, Japanese banks concluded a $2 billion, 10-year loan with in-

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[3] The discussion on Japan is drawn from an excellent report on Sino-Japanese economic relations by Todd Thurwacher, an officer in the U.S. Foreign and Commerical Service. See his "Japan in China: The Guangdong Example," *China Business Review*, January-February 1990, pp. 7-17.

TABLE 2
Japan & Hong Kong
Two-Way Trade with China, 1982-89

Year	U.S. $ Millions		·% of total trade		% of Asian Trade	
	Japan	Hong Kong	Japan	Hong Kong	Japan	Hong Kong
1982	8,708	6,495	21.4	15.9	47.7	35.6
1983	10,012	7,507	23.1	17.3	49.6	37.2
1984	13,212	9,416	26.0	18.5	49.9	35.5
1985	11,910	11,910	30.5	17.1	54.8	30.7
1986	17,542	15,348	23.5	20.6	46.2	40.4
1987	16,479	22,201	19.9	26.8	37.3	50.2
1988	19,108	30,244	18.5	29.4	33.7	53.3
1989	18,897	34,458	16.9	30.9	30.4	55.3

terest rates 0.25 percent above LIBOR (London Interbank Offered Rate). Other loans, including one from the Japanese government worth Y810 billion (about U.S. $5 billion) and featuring both low interest and a 10-year grace period, are apparently in the offing.[4]

One outcome of the Japanese strategy is that the majority of Japanese exports are high-valued-added goods; China, on the other hand, exports commodities or low-tech goods, as table 3 shows.

Another outcome of the strategy is that investment has followed the loans and trade. According to Chinese figures, in 1988 Japan provided about one-third of China's total foreign capital utilization (loans plus investment)—$3.3 billion—and about one-sixth of utilized direct foreign investment—$514 billion.[5] Chinese sources, looking at investment pledged or contracted for 1979-89, show Japan as the third largest investor in China after Hong Kong and the United States (see table 4). Toward the end of the decade, Japan surpassed the United States.

Japanese investment is spread across China, but is concentrated in either industrial sites—Shanghai, Beijing-Tainjin—or the Guangzhow economic zones; the industries are, not surprisingly, in those goods in which Japan excels in the Asian market: electronics, (e.g. CRTs), electrical appliances (e.g. refrigerators, washing machines, clock radios), and metals.

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[4] *Business China*, February 12, 1990, p.17.

[5] *Business China*, February 12, 1990, p.19.

Table 3
Sino-Japanese Trade by Commodity, 1988
(Percent of Value)

Chinese Imports from Japan		Chinese Exports to Japan	
U.S. $11.06 billion		U.S. $8.05 billion	
Machinery	40.8%	Petroleum	38.8%
Iron and Steel	39.7%	Textiles	26.1%
Telecommunications	11.1%	Clothing	17.6%
Vehicles	8.2%	Fruit and Vegetables	9.3%
		Iron and Steel	8.3%

SOURCE: Todd Thurwacher, "Japan in China: The Guangdong Example," *China Business Review*, January-February 1990, pp. 7-17.

TABLE 4
Shares of Contracted Foreign Investment in China
Top Five Sources, 1979-89
(U.S. $ billion)

Total	**36.79**	
Hong Kong and Macao	22.67	61.6%
United States	4.11	11.2%
Japan	3.18	8.7%
Singapore	0.69	1.9%
West Germany	0.59	1.6%

SOURCE: Official Chinese statistics cited in *Business China*, June 25, 1990, p. 193.

HONG KONG

As Table 2 shows, since 1985 Japan has been losing significant market share to Hong Kong. What accounts for this turn of events?

The answer, of course, is to be found in the hundreds of ships that lie at anchor in Victoria Harbor, the crowds of trucks that carry both Chinese and Hong Kong license plates that jam the roads between the territory and Guangdong, the freight cars that shuttle back and forth between Kowloon Station and the mainland and Kaitak's booming airfreight business. In short, Hong Kong has regained its natural and historical role in the political economy of the Pacific as the entrepôt for the China trade.

According to Hong Kong government statistics,[6] Hong Kong's imports from China grew from H.K. $15 billion in 1979 to H.K. $196.7 billion in 1989 (U.S. $1.9 billion to U.S. $25.2 billion at the current rate of exchange of U.S. $ 1=H.K. $7.8), an increase of 1226%. In 1979 about 37% of these imports was reexported; in 1989, 54% were reexports. In other words, there is significant double growth here; the value of Chinese goods reexported from Hong Kong grew by over 1800%.

The same kind of dramatic growth can also be seen in the exports from Hong Kong to China. Hong Kong's domestic exports to China went from H.K. $0.6 billion to H.K. $43 billion over the same period, an increase of well over 7500%. But at the same time, Hong Kong's reexports to China went from H.K. $1.3 billion in 1979 to H.K. $103 billion in 1989, an increase of 7800%. Another way to look at this would be the percentage of total world-wide Hong Kong imports reexported to the PRC: in 1979 the figure was 6.6%; by 1987 it had reached over 32%. In sum, China is the largest market for the territory's reexports. As we might expect, much of this indirect trade originates with or is destined for China's other major trading partners. In 1989, the U.S. took 62% of Hong Kong's China reexports (U.S. $8.46 billion); Japan accounted for 14% (U.S. $1.92 billion). Trade in services—banking, tourism—backs up this trade: in 1989, for instance, about 16 million trips were made from Hong Kong into China (in 1979, 3 million trips were made across the border).

But there is far more to the Hong Kong-China relationship than merchandise trade. Two other aspects are key to the relationship: investment and internal dimension of the reexport trade.

Hong Kong and China are now locked in a entangling web of mutual investments so tight that one might argue that economic union will occur long before 1997, the date for China's political reaccession of the territory. As Hong Kong is the greatest source of direct foreign investment in China, so too China is the leading "overseas investor" in Hong Kong.

Some 70% of direct foreign investment in the PRC comes from Hong Kong; over the decade 1979-1989 almost 22,000 enterprises with a realized capital of U.S. $15.4 billion were approved by the Chinese authorities. Most of these investments are relatively small-scale operations in the Special Economic Zones and Pearl River Delta area of Guangdong province (the home province of most Hong Kong people). They not only are the major source of Hong Kong re-export trade, but also are estimated to employ as many as

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[6] Hong Kong Government Secretariat, "Notes on Hong Kong-China Economic Relations," Hong Kong, April 1990. All the figures in this section are drawn from this report or are calculations based on them and DOTS.

2 million industrial workers—about twice the number working in industries in the territory.

China also has a very significant presence in Hong Kong, symbolized by the Bank of China building designed by I.M. Pei that dominates the Central district's skyline. According to a study published by the American Chamber of Commerce in Hong Kong in 1988,[7] there are over 360 PRC-related firms in the territory; this is undoubtedly an undercount. While most PRC-related operations have central government connections—the Chinese "flagship" investment vehicle is the China International Trust and Investment Corp. (CITIC) and at least one other firm, Everbright, reports directly to the Chinese State Council of Ministers—virtually every province and municipality in the PRC, with the exception of remote Xinjiang and Tibet—has direct representation in Hong Kong. Overall, China is the leading source of outside funds for investment in Hong Kong; in manufacturing, it ranks third after the United States and Japan.

The exact amounts invested are difficult to estimate—Hong Kong disclosure rules and confidential Chinese business practices obscure ownership and financial details, but *Business Asia* puts the figure at about U.S. $380 million. CITIC's investments, which go beyond manufacturing, are reported to have reached U.S. $1.3 billion. For comparison's sake, it should be noted that U.S. investment in Hong Kong manufacturing totals around U.S. $1.14 billion; Japanese investment equals some U.S. $893 million. China also holds important minority positions in some of the territory's high-profile service industries, including a 12.5% share in Cathay Pacific and 20% of Hong Kong Telecommunications.[8]

Thus it is clear that the economies of Hong Kong and the PRC are closely linked, and may form two legs of a China triad. The third leg of this evolving triad is Taiwan; in a most interesting way, Taiwan's growing relationship with the PRC runs straight through Hong Kong via the territory's indirect trade route.

TAIWAN

There has always been some amount of trade between Taiwan and mainland China. Before the political and economic reforms of Deng Xiaoping on the mainland and Jiang Jingguo on Taiwan this largely unacknowledged trade was restricted to traditional goods such as herbal medicines, and most of it went through Hong Kong. In addition there was some undocumented direct trade—some might call it smuggling—by fishermen and other nautical entrepreneurs across the Taiwan Straits.

But with the reforms on both side of the Straits in the mid-1980s, this trade began to expand, again mostly through Hong Kong. Mainland demand for Taiwan consumer goods and investment grew; funds began to flow to the Chinese special economic zones in Fujian province, directly across from Taiwan and the ancestral home of most Taiwanese. A combination of formal moves in the late 1980s facilitated these developments: in 1988 and 1990, Taiwan approved a broad range of PRC goods, from aluminum ingots to sesame seeds, for indirect import to the island; Taiwan business people were allowed to visit the mainland; a semi-official Taiwanese organization was set up in the United States and Hong Kong to ease trade; and on the mainland itself, special incentives for Taiwanese investment were granted by Fujian and Guangdong provinces and by the Special Economic Zones in Xiamen, Zhuhai, and Shantou.[9] Table 5 below indicates the growth in trade via Hong Kong as it also shows the imbalance in the trade in Taiwan's favor.

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[7] American Chamber of Commerce in Hong Kong, *PRC-Related Firms in Hong Kong and Macau*, Hong Kong, 1988.

[8] See Hong Kong Government Industry Department, *Overseas Investment in Hong Kong Manufacturing Industries*, 1989, Hong Kong 1990; Shane Green and Jill McGivering, "Enter the Dragon," *South China Morning Post*, October 6, 1990; "Hong Kong: Statistical Profile," *Business Asia*, April 1990, p. 47.

TABLE 5
Taiwan Trade with PRC via Hong Kong, 1984-1989
(U.S. $ millions)

Trade	1984	1989	1989 as % of 1984
From Taiwan	421.5	2,896.5	587
To Taiwan	128.1	586.9	358
Total	**549.6**	**3,483.5**	**533**

SOURCE: Hong Kong government figures in *China Trade Report*, July 1990, p. 160.

In other words Taiwan's 1989 two-way indirect trade with China through Hong Kong, worth some U.S. $3.48 billion, was greater than the PRC's two-way trade with Singapore (valued at US$3.2 billion). This merchandise trade has perhaps been doubled by Taiwanese tourism on the Mainland.[10]

But there is more to the picture than just trade and tourism. Taiwan has also become a major investor in mainland China; and because the Taipei government bans direct investment, the funds flow through Hong Kong. In 1989, according to Taiwanese sources, out of Taiwan's overseas investments of $3.2 billion, $2 billion went to the mainland, making Taiwan the largest source of foreign investment in China in 1989. Most of these funds have gone to Fujian and Guangdong provinces, and are concentrated in Xiamen, right across the Straits. Indeed, Taiwanese investment in Fujian is so important that some observers have called the province "an industrial park" for Taiwan, and have credited the investment with Fujian's superior economic performance.[11]

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[9] For a more detailed account and review, see Mitchell A. Silk, "Silent Partners," *China Business Review*, September–October 1990.

[10] "Taiwan: China Trade Explodes," *China Trade Report*, February 1989, p. 4.

[11] Data provided by the Chung Hwa Institute of Economic Research, Taipei, cited in "L'offensive des investisseurs taiwanais," *Le Figaro-Economique*, July 24, 1990, p. VIII. These numbers do not coincide with figures from the PRC Ministry of Foreign Economics Relations and Trade, which puts 1989 investment from Taiwan at U.S. $400 million; the discrepancy, typical of statistics in the China trade, may be due to the difference between amounts pledged and actual investment—see C. Cheng, "Taiwan Money: One Bright Spot," *Far Eastern Economic Review*, August 23, 1990, p. 42. See also Dinah Lee, Taiwan's Dollar Offensive is Gaining Ground in China," *Business Week*, June 11, 1990.

Investment from Taiwan is apt to continue at this startling pace. Taiwan has the largest hard currency reserves of any nation, about U.S. $80 million, and a large current account surplus. As with Hong Kong, the business opportunities and attachments of the mainland combine to provide Taiwan with a good location to which the island's businessmen can spin off their low-wage, low-skill industries as they prepare to compete upscale with Korea and Europe. Indeed, that seems to be the case, since in July 1990 some 600 Taiwan business people met in Beijing to discuss investment opportunities.[12]

SOUTH KOREA

While the growing interdependence of the PRC, Hong Kong, and Taiwan is striking, so too is the increasing competition between "The Chinas" and South Korea. While businesses in Hong Kong and Taiwan tend to be small or medium size family firms, Korean businesses with interests in China tend to be the *chaebols*, or industrial conglomerates. Korea conducts both direct and indirect trade with China, and indeed, there even has been talk of setting up a special economic zone in Shandong, a short boat ride from the Korean peninsula, for Korean investment. There are also reports that the two countries will set up trade offices in their respective capitals.[13]

These trade links are recent but continue to grow, even as China maintains relations with Pyongyang. Before 1985—when Chinese representatives attended an IMF meeting in Seoul—the trade was small and conducted through Hong Kong. But the ice broke that year; if we count both direct and indirect trade, Korea-PRC trade in 1985 totaled about $2 billion, with Korean exports valued at $1.2 billion, and Chinese exports at U.S. $0.8 billion. By 1988, just three years later, direct trade had increased by 150% to $3.65 billion and the total, including indirect trade, had reached $5.7 billion. South Korea, once a minor player in the China trade, by 1988 ranked fifth only behind Hong Kong, Japan, the United States and West Germany.[14]

Thus Korea's trade with China is substantial, greater than Taiwan's (if the island's undocumentable services-related trade is left out). Korean expertise in large-scale industry assures it a continuing role in China's economic evolution. Details are sketchy, but Korean banks are active in Hong Kong, and thus further north, and Korean firms are making investments in China: for instance, Daewoo is reported to have invested in a refrigerator plant in Fujian, and other major *chaebols*—Sunkyong, Samsung, Hyundai, and Lucky-Goldstar—likewise are active or at the least considering investments.[15]

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[12] "Red Carpet for Taiwan Money," *International Herald-Tribune*, July 6, 1990. China's relaxed attitude toward the environment may figure here as well. Certainly one of the most publicized nonevents of 1989-90 in the China investment area has been an effort by Formosa Plastics to build a new, U.S.$ 5 billion petrochemical plant in China. The company could not build the plant in Taiwan because of new environmental regulations, and was attempting to locate the new plant in Fujian. While the outcome of the effort remains in doubt, one suspects that other similar efforts will surface in the future. See *Business China*, July 30, 1990, pp. 107-108.

[13] "Mayor of Weihai Welcomes Investment by Korean Firms," *Korea Herald* (Kyodo), April 5, 1988; and James L. Tyson, "China, South Korea Bolster Ties," *Christian Science Monitor*, October 11, 1990.

[14] Ken Yun, "Crossing the Yellow Sea," *China Business Review*, January-February 1989; and "PRC-South Korea Trade Boom Set Back by PRC Political Crisis," *Business China*, June 26, 1989.

III. ASEAN

We have seen that the mainstay of China's Asian trade is with Japan and the NICs. What of China's trade relations with the ASEAN states?

In dollar terms, China's trade with the ASEAN has increased, going from $1.85 billion in 1980 to $6.6 billion in 1989; proportionally, the ASEAN share of the China trade has run to 4-6% of the total, and about 10% of the Asian sector. The annual growth has kept up with China's trade expansion, averaging 15.3% per year.

Of the ASEAN states, only Singapore has an important volume—around $3.2 billion in 1989; only Singapore and Indonesia showed growth in trade above the trend line, so shown in table 6.

TABLE 6
China's Trade with ASEAN
(U.S. $ Millions)

Trading Partner	Total		Growth Rate	% of PRC Asian Trade		% of 1989 Trade
	1980	1989	1980-89	1980	1989	
ASEAN	1,850	6,637	15.3	10.8%	10.6%	5.9%
Singapore	611	3,192	20.2	3.6%	5.1%	2.9%
Thailand	452	1,256	12.0	2.6%	2.0%	1.1%
Indonesia	35	805	41.7	2.0%	1.3%	0.07%
Malaysia	424	1,044	10.5	2.5%	1.7%	0.09%
Philippines	328	340	0.4	1.9%	0.5%	0.03%

NOTE: Brunei's trade with PRC is extremely small, ranging between $4 million and $10 million, much less than 1% and is virtually all Chinese exports.

SOURCE: The numbers in the table are from DOTS; the commentary draws upon the excellent and more detailed article by Clyde D. Stolenberg, "China's Links to Southeast Asia," *China Business Review*, May-June 1990, pp. 33-38.

Singapore's dominance of PRC-ASEAN trade reflects not only Chinese ethnic links but also Singapore's NIC economic capabilities; there are also some investments from Singapore in China, including a hotel in Xiamen, (another example of the strength of provincial sentiments for the motherland), and some joint ventures, including one with China's Satellite Communications Technology

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[15] Yun, op. cit., and "South Korea Forges New Links," *China Trade Report*, November 1988.

Corporation, a branch of the Chinese Academy of Sciences. Malaysia's trade record shows high steady growth, essentially consistent with ASEAN's share, but it is small, primarily agricultural commodities. Thailand's economic boom and close relations with China, largely due to the Cambodian crisis, combine to explain Thailand's standing in the PRC trade. Although the numbers suggest a minor decline in the economic relationship, this may just be an exception. In any event, the figures probably do not include China's military assistance and sales to Thailand. Interestingly, there has been some investment from Thailand in the PRC, mostly in processing industries, and China has invested in a small number of enterprises in Thailand, including construction firms and automobile parts factories. To be sure, none of these trade trends are absolutely smooth—for instance, trade with the Philippines hit a low of $188 million in 1983 and a high of 411 in 1985, all reflecting the political turmoil that has hit the island republic.

Certainly the most interesting trend here is that shown by Indonesia, the largest nation in ASEAN. Indonesia has not had diplomatic relations with China since the mid-1960s, when China was involved in a bloody but failed coup attempt that was followed by a massive anti-Chinese program that drew on the Sinophobia of the local Indonesian population. Despite that background, trade in the 1980s grew from year to year. Most of China's imports form Indonesia are in wood and agricultural products; China's exports are light manufactures. But more important, on the political front, Djakarta and Beijing established diplomatic relations in late 1990.

The importance of Indonesian-PRC ties is more than bilateral, however. Because of Indonesia's political weight in ASEAN, the move will have a positive effect on Sino-ASEAN links as a whole. Malaysia may now take a softer attitude toward China; and Singapore, always sensitive to the Chinese factor in the politics of its neighbors, established diplomatic relations with Beijing in October 1990, only after Indonesia made its move. As both the political and economic outlooks improve, PRC-ASEAN links will also solidify. However, in the absence of a truly major industrial base in Southeast Asia, it is unlikely that the ASEAN share of total China trade will exceed general trends. For ASEAN and the PRC alike, it is the major capitalist markets that will remain the most important.

IV. Other Asian Players

Two other Asian groups remain to be discussed: the Indian Subcontinent and the Communist countries. Neither group is an important participant in the China trade, and in both cases the change in trade relations has been negative.

Pakistan, not surprisingly, given the country's long-standing political links with China in the Sino-Soviet/Sino-Indian competition, is the PRC's largest trade partner in the region, but over the decade of the 1980s trade volume remained essentially constant or negative, starting at U.S. $312 million in 1980, dipping to U.S. $232 million in 1986, and rising again to U.S. $385 million in 1988 and U.S. $592 million in 1989. In other words, Pakistan's 1988 trade volume with China is just under the PRC-Philippine trade total; in 1989, it was just about equal to PRC-Macao trade throughout (U.S.

$615 million). India's trade over the decade reached a high point of U.S. $271 million in 1989, starting at U.S. $162 million in 1981 and hitting bottom in 1984 at U.S. $62 million. Other trade relations are minor, with only Bangladesh reaching trade volumes of over U.S. $100 million on the strength of Chinese exports in 1982, 1985, 1986, and 1988.

On the whole, the Subcontinent's total share of Chinese trade has declined—from a high of 2.2% in 1981 to a low of 0.8–1% from 1985 on. Pakistan has held about 50% of the area's total trade with China on average over the past decade, and India's share has ranged from 10% to 28% over the same period. Although the absolute numbers remain small, up to 1988, Indian exports to China had gained on Pakistani exports to the PRC; in 1989, however, there was a large jump in Chinese imports from Pakistan as shown in Table 7.

TABLE 7
China's Trade with India and Pakistan, 1981, 1983, 1989
(U.S. $ millions)

Types of Trade	1981		1988		1989	
	India	Pakistan	India	Pakistan	India	Pakistan
Total Two-Way Trade	**162**	**544**	**247**	**385**	**271**	**592**
Total % Subcontinent	17.4	58.4	28.1	43.8	24.9	54.3
Exports % Subcontinent	18.5	48.3	22.3	49.4	23.2	50.5
Imports % Subcontinent	16.4	67.3	46.7	26.4	28.3	62.0
Subcontinent % of total Chinese Trade	2.2		0.9		1.0	

Despite improving political relations with India and continuing friendship with Pakistan and Bangladesh, the economics of the relationships are not promising. Although India certainly has the greatest potential for international trade in South Asia, it has a long way to go—her total trade in 1988 came to U.S. $39.64 billion, about one-third of China's, just a bit more than Malaysia's (U.S. $37.69 billion), and, to look at another large Third World country, much less than Brazil's (U.S. $49.83 billion).

China's trade with Asian communist countries is also small, and is probably dominated by the military sector, which is apt to be unreported in any case. Trade figures with Laos and Kampuchea, if reported at all, barely figure in official statistics (U.S. $21 million total trade with Kampuchea in 1988, U.S. $18 million of which is for imports). Trade with Mongolia reached a high point of U.S. $25 million total in 1987 and 1988; much of this, we suspect, was conducted on a counter-trade basis.

North Korea's trade with China is somewhat more substantial, although as reported across the decade it has declined from a high of U.S. $677 million in 1980 to a low of U.S. $484 million in 1984, and ending at U.S. $562 million in 1989 (according to official figures). This volume is not trivial, but it is far surpassed by South Korea's trade, and falls between China's 1989 trade with Argentina (U.S. $576 million) and Spain (U.S. $498 million). Although it is likely that there is much cross-border and military trade that simply does not show up in the statistics, and it is true that the political relationship between Pyongyang and Beijing still is active, North Korea is simply out of the world economic loop, and thus does not play a very important role.

V. COMMODITIES TRADED

Thus far the discussion has focused on dollar volumes. For another perspective one needs to look at the commodity composition of trade. An important outcome of the Deng reforms has been a shift in China's export goods away from primary commodities toward manufactures—a common development path. The change can be seen by comparing Chinese exports for 1965—admittedly a period of isolation, the year before the Cultural Revolution—with those of 1987 (see Table 8).

TABLE 8
Percentage Structure of Chinese Merchandise Exports, 1965 vs. 1987

Year	Fuels, Minerals, metals	Other Primary Commodities	Machinery, Transport Equipment	Other Manufactured Goods	U.S. $ billions
1965	6	48	3	43	2.2
1987	14	16	4	66	39.5

SOURCE: The percentages are from *World Development Report*, 1989, World Bank, Washington, D.C., 1989, Table 16, p. 194. The sources for the dollar figures, are from different sources and thus not altogether consistent, 1965 figures from -- *Statistical Yearbook of China 1983*, State Statistical Bureau, Beijing, p. 421; 1987--DOTS (1989).

A more detailed analysis will be difficult for several reasons. First, China exports a variety of commodities, so an analysis may list goods that comprise 3% or less of imports or exports. Second, the way in which trade composition is reported—by Standard International Trade Classification (SITC) categories—may be convenient for customs officials but presents problems for a general analysis. For instance, beverages are classified along with tobacco in the same category (SITC 1), and not in the general food category

(SITC 0, which includes "live animals chiefly for food"). In addition there are two catch-all classifications, SITC 8, "Miscellaneous manufactured articles," and SITC 9, "Commodities not classified elsewhere."

This dilemma is shown by the growth of SITC 9 category goods ("Other") over the decade. In 1980, SITC 9 items comprised only 2% of total Chinese exports (by value); in 1987 the category accounted for 18% of exports. The major shifts that have accompanied this increasing diversity of exported products included a major decline in the value of petroleum exports, which reflected a drop in world oil prices, and a minor drop in food exports. Other categories, including manufactures, remained relatively steady.

Accordingly, one can gain a better understanding of the nature of the Chinese trade by looking at the top dozen items in the trade. Table 9 lists these exports according to Chinese customs statistics for 1987–89.

In other words, if one accepts the estimate that roughly two-thirds of Chinese exports are manufactures of some kind, almost half of those manufactured exports are in textiles (apparel, fabrics, fibers) and less than 5% of manufactured exports are in the higher valued-added areas of telecommunications and sound equipment, metal manufactures, and electrical machinery.

Overall these higher value-added categories, while small, show the greatest growth, far in excess of overall export growth. Since national economies grow through moving up the technological and value-added ladder, the figures indicate not only where China is headed but also why China is so sensitive to international measures affecting textiles and clothing (clothing itself is the next value-added step beyond fibers and fabrics).

Parenthetically it should be noted that the U.S. Arms Control and Disarmament Agency reports that arms made up a varying percentage of Chinese exports between 1980–87, starting at 1.5% of exports in 1980, reaching a peak of 7.2% in 1984 and falling, both in percentage and in value terms, to 2.5% in 1987. China's major customers during the period 1983–87 were Iraq (U.S. $3.3 billion worth of armor, aircraft, missiles and artillery), Iran (U.S. $1.8 billion) and Egypt (U.S. $550 million); in Asia, China sold arms to Thailand (about U.S. $90 million in small arms and substandard armor), Pakistan (U.S. $270 million) and Bangladesh (U.S. $120 million). The hard currency received for these weapons flowed back both to the Chinese military and to the technical industries; the relatively small amounts therefore have an importance.[16]

China's import composition is somewhat less concentrated in value terms, but with one important exception, is concentrated in industrial or intermediate goods, as shown in table 10.

The important exception here is the third item in the list, cereals; because of China's overwhelming concern over and difficulties with food supply, 9% of the PRC's imports went to either cereals for consumption or fertilizer; the jump in petroleum imports (and the corresponding decline in petroleum exports) may be related. But the major point to be drawn from this sea of figures is that

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[16] Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers*, 1988, Tables 3 & 4.

TABLE 9
Top Fifteen Chinese Exports
By Percentage of Total Export Value

Item	1987	1988	1989	1987/89 (% change by value)
Exports in U.S. $ billions (from Chinese customs)	39.44	47.54	52.49	33.1
Textile yarn, fabric	14.7	13.6	13.3	20.8
Clothing	9.5	10.2	11.7	63.5
Petroleum products	10.2	7.1	6.8	-10.5
Miscellaneous manufactures	3.4	3.5	4.3	72.1
Vegetable and fruit	3.3	3.4	3.1	25.8
Textile fibers	3.8	3.5	2.9	2.5
Metal manufactures	2.0	2.1	2.3	51.8
Telecommunications and sound equipment	1.3	1.7	2.2	126.0
Footwear	1.2	1.5	2.1	126.0
Fish, etc.	1.8	2.1	2.0	44.1
Electrical machinery	0.8	1.2	1.6	144.5
Non-metallic mineral manufactures	1.1	1.2	1.5	80.4
Animal feed	1.4	1.8	1.4	37.5
Iron and steel	1.1	2.1	1.4	68.4

SOURCE: Chinese Customs statistics compiled from China Trade Report and Business China, 1988-90.

China presents, in her foreign trade, the picture of a still industrializing nation: high-technology, high-skill goods are imported, and low-to-medium technology and skill products are exported.

Tables 11 and 12 show Asia's importance in trade with China in the top five import and export commodities for 1989.

TABLE 10
Top Fifteen Chinese Imports
By Percentage of Total Import Value
1987-1989

Item	1987	1988	1989	1987-89 % of Change
Imports in U.S. billions (from Chinese Customs)	43.22	55.25	59.14	36.9
Iron and steel	11.1	8.4	9.8	21.1
Specialized machinery	11.5	8.3	9.6	14.0
Cereals	3.9	3.4	5.0	76.7
Textile yarns and fabrics	4.3	4.3	4.8	54.0
Electrical machinery	3.7	4.2	4.1	50.4
General industrial machinery	4.0	3.9	4.0	37.3
Fertilizer	3.2	4.3	4.0	69.0
Textile fibers	2.6	3.5	3.9	102.3
Artificial resins, plastics	3.4	6.4	3.7	50.1
Telecommunications equipment	3.4	3.3	3.0	22.8
Transport equipment	3.4	3.3	3.0	20.2
Petroleum	0.9	1.2	2.5	269.0
Road vehicles	3.0	2.7	2.4	10.5
Organic chemicals	2.3	3.1	2.4	40.8
Power generating equipment	1.3	1.9	2.3	140.7

SOURCE: Chinese Customs statistics compiled from *China Trade Report and Business China*, 1988-90.

VI. Opportunities and Dilemmas

Opportunities and dilemmas are often the two sides of an issue, and certainly this would seem to apply in the case of China's foreign trade. Two related issues, however, seem to be predominate.

One is China's foreign trade standing relative to her Asian trading partners. Although China's foreign trade has improved in both quantity and quality, she is just keeping pace with the foreign

TABLE 11
Top Chinese Imports
By Country of Origin, 1989
Total Import Value = U.S. $59.14 Billion

Commodity	Value in U.S. $ billions	% of Imports	Nations of Origin	Amount for Each Nation (in U.S. $ billions)	% of Comm.
Iron and Steel (SITC Code 67)	5.80	9.8	Japan	2.84	49
			Germany	0.52	9
			USSR, EC, Brazil U.S.,	0.41	7
			East Europe	0.35	6
Specialized Industrial Machinery (SITC Code 72)	5.68	9.6	Japan	1.14	20
			Germany	0.91	16
			Hong Kong	0.74	13
			U.S.	0.62	11
Grain (SITC Code 4)	2.96	5	U.S.	1.42	48
			Austrailia	0.33	11
			Canada	0.30	10
			Thailand	0.27	9
Textile yarn	2.84	4.8	Hong Kong	1.42	50
			Japan	0.40	14
			EC	0.17	6
Electrical machinery (SITC Code 77)	2.42	4.1	Japan	0.65	27
			Hong Kong	0.51	21
			EC	0.29	12
			U.S.	0.19	8
Totals, top five imports	19.69	33.3			

SOURCE: Calculations based on data from *Business China*, May 14, 1990 and table 8.

trade performance of her smaller NIC neighbors. The key issue here is strategy. Taiwan and Korea, for instance, have not only seized upon a strategy of export-led growth, but have also promoted vigorous internal commercial and technological competition as a prerequisite and continuing condition of that growth. It is true that

TABLE 12
Top Five Chinese Exports
By Country of Destination, 1989
Total Export Value = $52.49 Billion

Commodity	Value in (U.S. $ billions)	% of Exports	Nations of Origin	Value (in U.S. billions)	% of Comm.
Textile yarn and fabric (SITC Code 65)	6.98	13.3	Hong Kong	3.42	49
			Japan	0.84	12
			EC	0.77	11
			U.S.	0.49	7
Apparel (SITC Code 84)	6.14	11.7	Hong Kong	1.97	32
			Japan	1.17	19
			U.S.	0.92	15
			EC	0.68	11
Petroleum (SITC Code 33)	3.57	6.8	Japan	1.78	50
			Singapore	0.61	17
			U.S.	0.57	16
			Hong Kong	0.18	5
Miscellaneous manufactures (SITC Code 89)	2.26	4.3	Hong Kong	0.86	38
			EC	0.36	16
			U.S.	0.32	14
			Japan	0.14	6
Vegetables and fruit (SITC Code 05)	1.63	3.1	Japan	0.46	28
			Hong Kong	0.44	27
			EC	0.13	8
			Germany	0.11	7
			U.S.	0.08	5
Totals, Top Five Exports	20.58	39.2			

SOURCE: Calculations based on data from *Business China*, May 28, 1990 and table 7.

these economies reached their take-off stages at the time when not only were the large markets of the capitalist democracies open but when those governments were actively promoting development through such schemes as the Generalized System of Preferences (GSP). But GSP simply provided the framework—the fact is that the NICs jumped on and have remained on the back of the tiger of competitive advantage.

China, on the other hand, persists in following the socialist road at a time when virtually all the traffic on that route, including the

Soviet Union, has taken the emergency exits. Even in the best of times during the decade of reform, the state plan remained the key. Now, after June 1989, the role of the state and the internationally uncompetitive state enterprises are even more important.[17] The issue is not so much planning itself, but rather the nature of that planning—and certainly China's record here has been to suppress the kind of internal competition so vital to international success. Indeed, this is only to be expected, given China's anxieties about competition and foreign-inspired disorder; this is reinforced by or reelected in the PRC's basic trade strategy of technology transfer for import-substitution, a path also now quite abandoned as an avenue to growth.

Several issues arise here. First, China's trade is indeed part of the most dynamic sector of the world trading system, but the strategy being followed may not allow for continued success. To be sure, the inertia of the reforms will keep China playing in the system, but the NICs, not to mention Japan, will ultimately pull away. This trend has not gone unnoticed in China. Fang Lizhi, the noted dissident, has written that because of the "weakness of the state system [that is, the current autocratic regime], the critical trend of the economic distance between mainland China and the developed countries has not been improved. In fact, the distance is increasing.[18]

But still other factors suggest that the distance—and the accompanying political tension—will continue to grow. One doubts that China will settle for simply being the dumping ground for old technologies competitive only because of the low cost of Chinese labor, a hinterland for the more advanced economies of the area. Furthermore, as the kind of foreign loans so necessary for continued upgrading of Chinese industry become harder to get in the post-Tiananmen environment, exports become increasingly important as a source of foreign exchange. But at the same time, protectionism in China's major capitalistic markets is growing and, as a result of China's austerity program, the economy as a whole is slowing. The contradictions facing China's trade are serious.

This economic dilemma, of course, has a larger political context. At the global level, there are the issues of China's perhaps diminished place in the superpower strategic triangle and the potential problems of a looming world recession, issues far beyond our charter here. At the national level, the 1988–89 austerity measures—a reform of the reforms—in China has much to do with the reinforcement of political orthodoxy or "stability," as the Chinese leadership puts it.

One target was the reformist economic decentralization that allowed for growth and development. But the decentralization fostered the reemergence of political regionalism as well, one of the plagues of Chinese history.[19] And thus the twin and stifling Sino-

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[17] See, for instance, James McGregor, "Beijing Faces Tough Choice between Reform, Political Ideology in Charting Economic Course," *Asian Wall Street Journal Weekly*, October 29, 1990, p. 17.

[18] Fang Lizhi, "Declaration to Support Democratic Reform in Mainland China," December 20, 1988, *World Affairs*, Winter 1989-1990, pp. 135–37.

[19] See, for instnance, Ann Scott Tyson, "Provincial Wars Over Trade Concern Chinese," *Christian Science Monitor*, October 18, 1990.

Leninist orthodoxies of economic and political centralism came to be revised.

Another dilemma/opportunity—closely related to the first—lies in the way in which the PRC handles Hong Kong. In order to understand the Hong Kong dilemma one needs knowledge of the larger Chinese political and economic scene, particularly the importance of personalities and the subordination of economic logic to the political imperative.

Over the past decade, even in the face of the 1997 reaccession of Hong Kong, that nation has become increasingly more important in China's foreign trade picture. Hong Kong's sophisticated infrastructure—physical, financial, communications—is crucial to this achievement. Indeed, a mutual dependency appears to have been established, and it seems logical that China would take genuine steps to assure confidence in the territory.

But the events of June 1989, Chinese maneuvering over the Basic Law that is to govern Hong Kong after 1997, and the specter of centrist economic orthodoxy have combined to introduce doubts. Many of Hong Kong's best and brightest people are emigrating, and recent attempts by the U.K. government to guarantee the right of British abode to a certain number of the Hong Kong public have only been met with Chinese hostility. Accordingly, the immediate psychological outlook for Hong Kong is uncertain—business confidence is down. [20] Would China interfere, to Hong Kong's—and China's—detriment?

On the one hand, Hong Kong's economic importance to China cannot be denied. On the other hand, one should not overlook Hong Kong's political significance. Regaining Hong Kong will, for many Chinese leaders, have a profoundly nationalistic resonance—it will write finis to the Opium War, the conflict which ushered in a century of civil war and humiliation by foreigners.

China's desire to recover the territory and deal with Taiwan may very well have led to the soothing formulation, "One Country, Two Systems"—a slogan that could also be applied to Taiwan. But a certain skepticism must be expressed. Why should we expect a great power to stick to a bilateral agreement without enforcement provisions, particularly when that agreement deals with long-coveted irredenta?

But there are other issues to be raised here as well. To a large degree the course of Chinese history has been an attempt to solve a difficult political problem—how to rule a huge country with a large and fractious population from a single center. The answer, imposed by the First Emperor and pursued by all other Chinese regimes, was One Country, One System—the supremacy of politics. The events of June 1989 show that Chinese tolerance for political heterodoxy—much less political pluralism—remains extremely low.

Furthermore, when other variables in the equation are added—the authoritarian impulse to meddle and to compel conformity, the Chinese habit of seeing politics in all things, and the lack of sophisticated managers to keep Hong Kong running—one can begin to have a new appreciation for the people standing in lines outside foreign consulates in the territory.

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[20] See "Political Uncertainty Hits Optimism," *Asian Business*, April 1990. p. 39.

But there is a brighter side. After June 1989, building and investment in the territory continued "without a blip," as a long-time Hong Kong watcher put it. And as another colleague with many years of experience in Hong Kong opined, the political/economic issue is much more likely to result in the "Hongkongization" of South China than in the Communization of Hong Kong. And it certainly is true that south of that age-old dividing line, the Yangtze River, and along the coast, both Hong Kong money and Hong Kong values have had a great impact.

Thus if the nature of the Chinese system does not bode well for Hong Kong, the momentum of change runs in Hong Kong's favor. It is precisely the tension generated by these countervailing currents that sparks the uncertainty in Hong Kong. It may be going too far to say that the future of the China trade depends on the future of Hong Kong, but certainly large parts of those futures overlap.

But Hong Kong's future—and indeed the future of China—is more locked up with issues of personalities than any other factor. Here the key matter will be the outcome of the succession drama that will follow the passing of Deng Xiaoping and other first-generation revolutionaries who, despite their formal retirements, remain the primary power brokers in the system. Political analysis, takes me beyond my charter, but it would appear that the current Li Peng-Yang Shangkun-Zhang Zemin leadership is transitional, dependent on hasty relationships and requirements arising from the Tiananmen events. Furthermore, the time remaining to Hong Kong—six years—is virtually an entire policy cycle in the larger 41-year history of the PRC. Thus one cannot say whether upon the passing of the Old Guard we will see a de facto regionalism with a weak center masquerading as a strong government, military rule, the continuation of a centrist line, or some combination of the three alternatives. Besides, there are some Chinese observers, perhaps reflecting a bit of wishful thinking, who expect acute struggle and maybe even civil war.

But one can say that a peaceful transition—or at the least a transition promising stability—would only enhance trade with the region as a whole. And in the countdown to the reacquisition of Hong Kong there is time for a reassessment of larger trade and economic development strategies to address the dilemmas and opportunities just outlined. The incentives for focused change seem evident; the likelihood of some kind of change seems probable, even if the question of direction remains unresolved. Asia's importance in the China trade is clear. Certainly China's leaders must be aware that in the current global context—the political reaction in the West to Tiananmen, strategic shifts and continuing Asian dynamism in the face of world-wide slowdown—trade with Asia will take on even greater importance for the People's Republic of China.

U.S.-CHINA COMMERCIAL RELATIONS: A DECADE AFTER NORMALIZATION

By Nai-Ruenn Chen [*]

CONTENTS

	Page
Summary	895
I. Introduction	896
II. Recent Trends	897
Trade	897
Investment	898
III. Main Issues	899
Divergent Objectives and Trade Issues	899
U.S. Exports to China	900
U.S. Imports from China	903
Trade Imbalance	905
The Business Climate in China	905
IV.Governmental Relations	906
A Decade of Development	906
The Impact of Tiananmen	907
V.Prospects	908

SUMMARY

Since the establishment of diplomatic relations between the United States and the People's Republic of China in 1979, a broad range of bilateral economic and commercial ties have gradually developed. U.S. trade with China, driven largely by imports of Chinese goods, has grown rapidly. Investment relations also have expanded significantly, primarily due to large amounts of U.S. investment in China.

Growing U.S.-China commercial relations have been accompanied by a number of trade issues. The main issues relating to U.S. exports to China have focused on U.S. export control policy, U.S. access to the Chinese market, and the protection of U.S. intellectual property rights in China. On the import side, two issues—the textile trade and the application of U.S. import control laws to products from China—have dominated bilateral discussions. The issue of China's growing trade surplus with the U.S. has been complicated by the problem of discrepancies between Chinese and U.S. trade statistics. The business climate in China, in which many foreign companies have found it difficult to operate, has become more restrictive since late 1988 due to the economic recentralization and

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increased administrative controls resulting from the austerity policy.

To manage trade issues and facilitate the expansion of commercial relations, the two countries made much progress in the 1980s in developing a general framework for expanded trade largely through government-to-government agreements and consultations. In addition, trade issues were handled through multilateral channels.

This decade-long progress was disrupted by the Tiananmen incident in June 1989. The U.S. government responded to the political events in China by imposing a number of sanctions on important elements in bilateral relations, including those related to trade. At present, many of these elements are still on hold.

In the near term, the U.S.-China commercial relationship is likely to center on issues such as economic sanctions, annual renewal of China's MFN status, the trade imbalance, intellectual property rights, textile trade, and the business environment in China. In the long term, the commercial relationship will be affected by the degree of success that both countries have in resolving these issues, as well as their relations with other trading partners. China's growing economic relations with Hong Kong and Taiwan will especially have a far reaching impact on its trade with the United States. Most fundamentally, however, the long-term commercial relationship between the two countries will be determined by the political environment in China, including the degree of political stability and types of policies pursued by the Chinese leadership.

I. INTRODUCTION

With the establishment of diplomatic relations between the United States and the People's Republic of China in 1979, the two countries began to develop a broad range of economic and commercial ties. U.S. trade with and investment in China, facilitated by government-to-government agreements and consultations, expanded rapidly in the 1980s. The decade-long progress, however, was disrupted by the June 1989 turmoil in Beijing. During the past year, U.S. economic relations with China have been dominated by issues such as sanctions, the debate over the renewal of China's Most-Favored-Nation (MFN) status, and concern about China's retreat from economic reforms. Contrary to the high hopes of a year ago, U.S.-China commercial relations are now clouded by tension and uncertainties.

To assess the future of these relations, the paper begins by looking back at the progress made during the past decade. A recounting of trends in bilateral trade and investment and discussion of the management of major trade issues is followed by a review of the development of government-to-government relations in the decade since 1979, and U.S. economic responses to the political events in China since the Tiananmin incident. Finally, I examine the major factors which will likely shape the course of U.S.-China commercial relations in the 1990s.[1]

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[1] Information used in this chapter was available as of August 31, 1990.

II. RECENT TRENDS

TRADE

After a twenty-year hiatus, U.S.-China trade resumed in 1972, but remained minimal until 1979, when diplomatic relations were established and China's "open door" policy was initiated. In 1979, bilateral trade totaled $2.3 billion. Ten years later, it reached $17.8 billion. Trade is continuing to grow, and reached $9 billion in the first half of 1990, up 18 percent over the same period in 1989.

U.S. exports to China have fluctuated widely since 1979, largely due to wide variations in Chinese demand for American agricultural products and changes in China's economic, trade, and foreign exchange policies. Political developments since June 1989 have further affected U.S. exports to China. U.S. exports were up 26 percent in the first quarter of 1989 over comparable 1988 levels, 19 percent by mid-year, and only 16 percent at year-end. For 1989 as a whole, U.S. exports to China totaled $5.8 billion. Exports are declining this year, with first six-month export volume estimated at $2.5 billion, down 10.3 percent from the same period last year. In recent years, China has ranked between fifteenth to seventeenth among the largest markets for American products, accounting for about 1.6 percent of total U.S. exports.

The commodity composition of U.S. exports to China has undergone significant changes since 1979. The share of agricultural products in U.S. exports to China was 58 percent in 1979, but declined sharply in the first half of the 1980s to only 2 percent in 1986. Increases in domestic grain production as well as the Chinese government's desire to diversify the sources of foreign grain supplies were largely responsible for this decline. U.S. agricultural exports to China began to recover in 1987, and reached 24 percent of total U.S. exports to China by 1989. The recovery was due to China's failure to meet grain production targets in the last few years. Chinese purchases have been facilitated by the U.S. Export Enhancement Program.

Among U.S. nonagricultural exports to China, machinery and transport equipment shipments have risen most dramatically. These shipments totaled only $229 million in 1979, or 13 percent of U.S. total exports to China, but expanded rapidly in the first half of the 1980s to reach a peak of $1.94 billion in 1985, or 50 percent of the total. This rapid growth was caused by China's demand for these products to support its modernization program, and by the liberalization of U.S. export control policy toward China. Decentralization of China's foreign trade administration was also a contributing factor. U.S. shipments, however, have declined since 1986 largely due to tighter central government control over foreign exchange spending and, more recently, economic retrenchment policies. At $1.91 billion in 1989, machinery and transport equipment still constituted the most important component of U.S. exports to China. The leading exports in this category were aircraft and parts, specialized industrial machinery, power generating equipment, electrical machinery, and office and automatic data processing machines.

Unlike the ups and downs in exports, U.S. import trade with China has grown almost without interruption. U.S. imports from China totaled $592 million in 1979 and, except for a slight dip in 1983, have grown every year at high rates, reaching $12 billion in 1989. Despite the political turmoil in the spring of 1989, import growth accelerated during that year—up 26 percent in the first quarter, 37 percent by mid-year, and 41 percent by the end of the year. This momentum continues to grow, with imports totaling $6.6 billion in the first half of 1990, an increase of 33 percent over January–June 1989 levels. As a result, China now ranks eighth among suppliers to the U.S. with a market share of 2.8 percent.

The commodity composition of U.S. imports from China has changed significantly in recent years. In the early 1980s, U.S. imports from China were dominated by textile and petroleum products. Sales of China's top three export categories—clothing, petroleum, and textiles—accounted for 50–60 percent of China's exports to the United States during 1981–85. Despite the continuing strength of these sales, China's exports have steadily diversified in recent years. In 1989, the same three categories made up only 28 percent of the value of China's exports to the United States. China's exports of light manufactures, telecommunications equipment, and electrical appliances have grown most rapidly. Toys, games, and sporting goods, consumer electronics, footwear, and travel goods are now among China's top export earners in its trade with the United States. The increased diversification of China's exports reflects its competitive strength, which has been bolstered in recent years by the relocation of large numbers of export-oriented processing and assembly plants from Hong Kong and Taiwan to the Chinese mainland.

INVESTMENT

In tandem with increased trade, investment relations between the two countries have grown significantly over the past decade. In response to China's "open door" policies, U.S. firms began to invest in China in 1979. Since then U.S. investment in China has taken a variety of forms—equity joint ventures, contractual joint ventures, wholly-owned subsidiaries, and joint development of offshore oil resources. By the end of 1988, the total amount of investment pledged by U.S. firms had reached $3.3 billion, accounting for 13 percent of total foreign investment in China.

During 1989 U.S. investment in China continued to grow, despite difficulties caused by China's austerity program and mid-year political disturbances. Chinese authorities reported that contracts involving nearly $1 billion in U.S. investment were approved during the year. However, negotiations of most, if not all, of these contracts were initiated before the inception of economic retrenchment in the fall of 1988. U.S. investors' interest has fallen off drastically since Tiananmen. At the end of 1989, U.S. investors had about 950 projects in China, with a total contracted U.S. investment of more than $4 billion and paid-in capital of $1.8 billion.

China is interested in pursuing investments in the United States, although limited foreign exchange availability has prevented the Chinese from undertaking large investment projects. Through

American operations, the Chinese hope to gain access to advanced technology, obtain first-hand experience in modern production and management techniques, and keep abreast of new marketing developments. They may also seek to ensure access to supplies of raw materials for Chinese industry.

As of year-end 1989, the number of Chinese joint ventures in the United States stood at 168, with the amount of capitalization valued at $440 million. Of this total, $370 million has been contributed by the Chinese side. These ventures generally are small in scale and are primarily involved in foreign trade or in production sectors such as electronics manufacturing, machine tools, steel, timber, fishing, and food processing.

III. Main Issues

DIVERGENT OBJECTIVES AND TRADE ISSUES

After a decade of expansion, U.S.-China trade and investment levels remain considerably below their full potential. In 1989, U.S.-China trade constituted only 2.1 percent of U.S. total trade, while U.S. investment in China accounted for only about 1 percent of U.S. investment in Asia. In view of the many complementary aspects of the American and Chinese economies, room for further expansion in trade and investment relations should be substantial. These relations, however, have been restrained by a wide range of issues.

The United States and the PRC have different values, institutions, and expectations. The United States values human rights, democracy, and free enterprise, while China places high priority on socialist ideology, the political principles of the Chinese Communist Party, and a system of public ownership. These basic differences are reflected in different objectives of respective national and foreign policies, which in turn affect both countries' perceptions of their bilateral economic and trade relationship. The impact of these differences on the bilateral relationship has been clearly demonstrated over the past year by the Tiananmen incident and subsequent events.

The United States maintains a basically free trading system. To protect national security, however, the Export Administration Act authorizes the President to impose controls on the export of strategic and high-technology products and technical data originating in the United States. On the import side, U.S. law also provides safeguard measures to protect against unfair trade practices and market disruption from rapidly increasing imports. These American laws run counter to some of the objectives of China's economic modernization and foreign trade policies. For China, the importation of high-technology products is a top national priority. Many of these products, however, are subject to U.S. and multilateral export controls. To pay for imports China needs to generate adequate export earnings. But a number of Chinese export commodities, especially textiles, are subject to import restrictions in the United States.

The United States and China also differ in their expectations of investment. American firms invest abroad primarily to gain access to a foreign market or take advantage of lower production costs.

Their single most important goal is to maximize their profits. In most cases, U.S. firms invest in China in order to establish a foothold that will allow them to penetrate China's domestic market. China turns to foreign capital primarily to supplement domestic financial sources for economic modernization and to obtain greater access to advanced technology, management skills, and international distribution channels. China also seeks to use foreign capital for the purpose of developing its priority sectors, and especially to use foreign capital in ventures which increase China's export competitiveness and introduce advanced technology to China. Profitability, while important to Chinese enterprises participating the joint ventures, may not be an overriding consideration for Chinese policymakers.

The differences between U.S. and Chinese trade and investment policy objectives have been considerably sharpened by recent changes in both economies and in the global marketplace. The chronic trade deficit that the United States suffers has created pressure on Congress and the Administration to support U.S. producers against unfair competition. Moreover, U.S. trade policy also seeks to promote exports by reducing foreign trade barriers and increasing U.S. market access abroad. The Omnibus Trade and Competitiveness Act of 1988 spells out procedures for tackling a number of key issues of concern to American businesses, especially the unfair trade practices used by trading partners and the protection of U.S. intellectual property rights.

Meanwhile, China also has experienced several phases of foreign exchange shortages. In 1984, for example, foreign trade reforms resulted in a sudden reversal of the country's positive trade balance and a rapid decline in its foreign exchange reserves. The situation was aggravated further by losses in export earnings due to a decline in world oil prices. More recently, economic austerity and political turmoil have had a severe impact on external economic relations, resulting in diminishing sources of foreign exchange income. Driven by a desire to maintain a balance in the international payments position, the Chinese government's response to foreign exchange shortages has typically been to restrict imports and promote exports. The effect on U.S.-China trade has been a rapidly growing imbalance for the United States.

Divergent economic objectives have led to trade frictions between the two countries. This section reviews the main issues that have been prominent in the U.S.-China trade relationship over the past decade. These issues are related to U.S. exports, U.S. imports, the balance of trade, and the business climate in China.

U.S. EXPORTS TO CHINA

Bilateral issues pertinent to U.S. exports to China have arisen mostly in two broad areas: the transfer of U.S. technology to China and the access of U.S. products and services to the Chinese domestic market. Related to both areas are also the issues involving the protection of U.S. intellectual property rights in China.

The technology transfer issue centers on U.S. export control policy toward China. One principal incentive for China to normalize relations with the United States in 1979 was its desire to gain greater access to U.S. high-technology products for promoting economic and technological modernization. Prompted by U.S. interest in improving relations with China and mounting pressure from American exporters, the U.S. Government began to liberalize export control policy toward China in May of 1983.[2] It then gradually and significantly enhanced the technical levels of products allowed to be exported to China, and simplified export control procedures. The number of export license approvals increased from about 2,800 in 1983 to 5,700 in 1988, while the value of approved applications rose from $900 million to nearly $3 billion. The United States was close to implementation of a distribution license procedure in June 1989 for China, which would allow multiple shipments under a single license. The procedure has been put on indefinite hold due to Tiananmen.

Prior to June 1989, the U.S. government joined other members of the Coordinating Committee for Multilateral Export Controls (COCOM) to propose further steps to liberalize export controls on high-technology exports to China. The proposal, however, also has been suspended.

Another issue relating to U.S. exports to China has to do with the access of American goods and services to the Chinese market. U.S. firms' entry into the Chinese market is hindered by a complex system of administrative and market controls that China has put in place to keep both exports and imports in line with trade policy and balance-of-payment objectives. The system of administrative controls includes: (1) import bans; (2) import planning; (3) import licensing; (4) import substitution; (5) certificate of approval; (6) import registration; (7) quality licensing· and (8) foreign exchange control.[3] The system of market controls relies on the use of "eco-

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[2] Shortly after the lifting of the embargo on trade with China in 1971, the United States placed China in country group Y, allowing for sales of nonstrategic goods similar to those allowable for Warsaw Pact countries. In April 1980, more than a year after normalization, China was placed in a separate group of its own, Group P, which was created to maintain the same level of restrictiveness as Group Y, but to allow some differentiation in favor of China. In June 1981, the Reagan Administration announced that for high-technology exports to China there would be "a presumption of approval for products with technical levels twice those previously approved." But this so-called "two-times" policy was not clearly defined, and was difficult to implement. China's complaint about the limits of its "P" status heightened in 1982 and in the spring of 1983, and became a crucial issue in the bilateral relationship.

In May 1983, the Reagan Administration transferred China to country group V, which covered "free world" countries outside of North and South America ranging from NATO allies to India and Yugoslavia. To speed up the processing of license applications, the U.S. Government took additional steps in November 1983 by creating a system of green, yellow, and red "technology zones" to be used in the evaluation of U.S. export license applications for China. "Green zone" applications would be exempt from inter-agency and COCOM review and would be processed with a presumption of approval.

[3] Currently, import bans cover approximately 80 types of consumer goods, raw materials, and production equipment. Under import planning, the government sets limits to the quantity of imports of key commodities.

The system of import licensing began in January 1984 when license requirements were imposed for imports of 26 product categories. Prior to the initiation of retrenchment policies in September 1988, the list had expanded to 53 categories, affecting about one-third of China's imports. Since then China has increased further the use of licensing—the system now covers an estimated 40 to 50 percent of China's imports by value. In recent years, import substitution regulations have been issued restricting the import of a number of products, especially machinery and electronics, for which domestically produced substitutes are available.

Since 1981 certificates of approval from China's automotive industry officials have been required for motor vehicle imports. Beginning in January 1986, this practice has been extended to the import of other foreign products, such as insecticides. Import registration has been introduced for foreign agrochemicals and veterinary drugs, requiring costly tests for quality control and environmental impact prior to importation. Since May 1990, a quality license system has

Continued

nomic levers," such as tariffs, taxation, prices, and exchange rates.[4]

These various administrative and market controls, individually and in combination, have severely restricted access of American goods to the Chinese market. Access to the Chinese services market is even more restrictive. U.S. service industries operating in China generally do not receive the "national" treatment granted Chinese enterprises undertaking service activities in the United States.

Related to both the export control and market access issues is protection of intellectual property—trademarked goods, patented inventions, copyrighted works, and trade secrets. Intellectual property represents a huge investment by U.S. firms in research and development and is the key to their competitiveness at home and abroad. Inadequate protection of foreign intellectual property by the Chinese discourages firms from transferring technology to China, thereby restricting sales.

Under the U.S.-China Agreement on Trade Relations signed in 1979, each country must take steps to protect the patents, trademarks, and copyrights belonging to citizens of the other. Since then China has made significant progress in establishing a regime for the protection of intellectual property. China has adopted a law on trademarks, enacted a patent law, and joined several international organizations and conventions for the protection of intellectual property. Deficiencies, however, remain in several areas.

Of particular concern to U.S. companies is the lack of adequate and effective protection for chemical formulas and copyrighted works, including computer software. The Chinese patent law does not provide product protection for pharmaceuticals and substances produced by means of chemical processes, such as agricultural chemicals. Some U.S. patented products have been produced in China without license for both the domestic and export market. China is in the process of enacting a copyright law. Until the law is promulgated, U.S. publications have no copyright protection in China. Book, tape, and computer software piracy is widespread, resulting in substantial losses in U.S. sales.

In May 1989, both governments negotiated a memorandum of understanding in which China agreed to submit a copyright law to the National People's Congress by the end of that year. The law, which reportedly includes provisions for protection of computer software, has yet to be formally enacted. China also agreed to amend its patent law to extend the term and scope of protection.

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been adopted, requiring exporters of nine machinery and electronics products to provide product samples and pay for their testing to receive a license.

To obtain foreign exchange, Chinese organizations must comply with a variety of internal regulations and plan guidelines. These regulations and guidelines are generally not available to the public.

[4] Chinese tariffs are relatively high, especially for many industrial items of interest to U.S. exporters. Since June 1985, China has also applied an "import regulatory tax" to selected imports. Imported goods are also subject to the consolidated industrial and commercial tax.

At present, three principal methods are in use to determine the domestic price of imported goods: the agent price, the markup price, and the state-determined price. All of these pricing methods allow considerable leeway for China to raise and lower prices in order to protect its domestic market. China also has progressively devalued the renminbi against major Western currencies to stimulate exports and curb imports. The RMB-to-U.S. dollar exchange rate was approximately 1.7 yuan per U.S. dollar in 1981, and has gradually declined to the current rate of 4.7 yuan per U.S. dollar.

Under the "Special 301" provision of the 1988 Trade Act, China was placed on the "priority watch list" in both 1989 and 1990 due to deficiencies in its intellectual property rights regime. A bilateral working group on intellectual property rights has been established since October 1989 under the auspices of the Joint Commission on Commerce and Trade to meet periodically in Beijing in order to resolve individual company problems.

U.S. IMPORTS FROM CHINA

Two issues affecting U.S. imports from China—the textile trade and the application of U.S. import control laws to products from China—have dominated bilateral discussions over the past decade.

Rapidly rising U.S. imports of Chinese textiles and apparel have become contentious issues in Sino-American trade. In 1979, the year during which diplomatic relations were established, U.S. imports of Chinese textiles and apparel totaled 231.2 million square yard equivalents (SYEs), or 5 percent of total U.S. imports. By 1989, Chinese imports had grown to approximately 2 billion SYEs, accounting for nearly 14 percent of total U.S. imports. In terms of volume, China has become the largest supplier of textiles and apparel to the United States since 1985.

The United States has negotiated three textile agreements with China.[5] The current agreement, signed in February 1988, limits the aggregate growth of China's textile and apparel exports to the United States to about 3.3 percent per year. This rate is calculated on a quantity basis. In value terms, China's exports have been considerably higher than the agreed rate since the Chinese have been able to shift toward exports of higher value-added textile products. The current agreement will expire at the end of 1991.

Although restraints on Chinese textiles are the main source of Chinese displeasure with U.S. restrictions on imports of Chinese goods, China also has complained about U.S. antidumping law and other U.S. trade remedies that have been applied to China. Since 1980, 16 antidumping cases have been filed against Chinese exports to the United States. In 11 cases, Chinese goods were found to have been "dumped," or sold at less than fair market value. The dumping margins on these cases ranged from 0.97 to 120.07 percent.

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[5] The first agreement, reached in 1980, was applicable to textiles and textile products of cotton, wool, and manmade fibers and provided for specific limitations on eight categories of wearing apparel. The agreement expired at the end of 1982. In the absence of an agreement after four rounds of negotiations, the U.S. Government imposed unilateral controls on 32 textile and apparel categories, beginning in January 1983. In response, China announced that it would stop signing new contracts for delivery of U.S. grain, cotton, and synthetic fibers.

In August 1983, after the seventh round of negotiations, the United States and China signed a new five-year agreement which included specific limits in some 33 product categories and provided for an annual average growth rate of 3.8 percent on U.S. imports of these products alone. China announced at the same time that it would lift its restrictions on imports of U.S. agricultural and fiber products.

As the second textile agreement was approaching expiration, U.S.-China trade relations again became tense. At issue was U.S. imposition of quantitative limits on a number of additional textile categories covered by the new Multifiber Arrangement (MFA) protocol. On August 1, 1986, more than 50 textile-trading nations agreed to the new protocol, which covered a greater range of fibers than previous agreements. The new list extended beyond wool, cotton, cotton blends, and synthetics to ramie, linen, and silk blends, at the insistence of the United States. China, the world's largely producer of ramie, strongly objected to the new restrictions, while the United States continued to exercise its authority under U.S. domestic law to unilaterally control trade in certain new MFA fiber products.

The issue became contentious as the two countries began to negotiate the third textile agreement in early 1987. After several rounds of negotiations, a four-year agreement was signed in February 1988.

The Chinese, and to some extent U.S. importers, consider the U.S. antidumping law as applied to China unfair and unpredictable.[6] Section 1336 of the 1988 Trade Act required the Department of Commerce to conduct a study of China's market orientation addressing, among other things, the possible need for changes in the U.S. antidumping law applicable to foreign countries, such as China, in transition to a more market-oriented economy. The study, submitted to Congress in August 1989, concludes that "amending this law to provide some form of differential treatment for economies in transition to greater market orientation should not be undertaken until such time that economic reforms have generated meaningful benchmarks for determining whether sales to the United States are made at less than fair value." [7] Section 406 of the Trade Act of 1974 provides a mechanism to prevent or remedy the disruption of the U.S. market by imports from Communist countries.[8] The statute has been applied to China on five occasions. In four of these cases, either the International Trade Commission found no conclusive evidence that imports in question were causing market disruption, or the President declined to take any remedial action against China.[9] Thus Section 406 so far has not been a significant barrier to Chinese exports. To the Chinese, however, the statute is discriminatory because it applies only to imports from non-market economy countries.

In September 1983, the U.S. textile industry's dissatisfaction with the 1983 U.S.-China textile agreement prompted the filing of a countervailing duty case on Chinese textile and apparel imports, which charged that the Chinese benefited unfairly from subsidies conferred by dual exchange rates and other government programs.[10] This was the first attempt ever made to apply the countervailing duty law to a nonmarket economy country. The case was withdrawn shortly before the White House announcement on December 16, 1983, of additional textile import guidelines designed to moderate the growth of imports.

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[6] Under the U.S. law, foreign goods are found to be "dumped" if they are sold in the United States at less than fair value, and if such sales consequently cause or threaten material injury to a competing U.S. industry. This determination requires a comparison between the foreign market value of imports (the price at which they are sold in the country of origin), and their sales price in the United States, adjusted for differences in the quality and type of goods and their circumstances of sale. If, however, the economy of the exporting country is "state-controlled," home-market prices may not be regarded as furnishing an acceptable basis for determining the foreign fair market value. In this case, the law provides that foreign market value can be determined by reference to a market-oriented third country whose level of economic development is deemed similar to the country under investigation. To determine fair value in cases involving China, the Department of Commerce has used cost data from "surrogates" in Paraguay, Thailand, Indonesia, India, Sri Lanka, Malaysia, the Philippines, Pakistan, and a few others.

[7] *Study of China's New Market Orientation and U.S. Trade Laws*, U.S. Department of Commerce, August 1989, p.9.

[8] Under Section 406 requirements, three conditions must be satisfied before the International Trade Commission can address the issue of relief. First, imports of the product in question must be increasing rapidly, either in actual terms or relative to domestic production. Second, the domestic industry must have suffered, or be threatened with, material injury or threat of injury. And third, imports must be a significant cause of the material injury or threat of injury. If the ITC determines in favor of the petitioner, the President must make the final determination of what relief, if any, should be granted. The President's discretion under the law is very broad.

[9] In the case of tungsten imports from China, the International Trade Commission voted unanimously that Chinese exports were disrupting the U.S. market. The President decided to provide relief to the domestic industry in the form of an orderly marketing arrangement, which was negotiated in August 1987.

[10] The U.S. law provides that whenever a foreign government subsidizes the production of exportation of an article, the United States may counteract the competitive advantage that the import has in the U.S. market because of the subsidy by levying a countervailing duty equal to the amount of the subsidy.

TRADE IMBALANCE

Traditionally, China has practiced a policy of trying to balance trade bilaterally, and has taken the position that only through expanded exports can it finance increased imports. During periods of rising trade deficits, stringent measures are usually employed both to restrict imports and promote exports. In recent years, the U.S. market especially has been targeted for export growth.

Since 1983 the United States has had a trade deficit with China. The U.S. deficit increased from $71 million in 1983 to $6.2 billion in 1989, the sixth largest bilateral deficit worldwide. The deficit issue has never been thoroughly discussed in bilateral consultations, but, as will be noted later, is likely to become prominent in the future trade agenda.

Closely related to the trade deficit issue is the problem of discrepancies between Chinese and U.S. trade data. Official Chinese trade statistics differ widely from U.S. trade statistics. For 1989, U.S. Department of Commerce statistics show a total of $18 billion in two-way trade, compared to the Chinese Customs Administration's estimate of $12.3 billion. U.S. data disclose a U.S. trade deficit of $6.2 billion with China in 1989, while Chinese customs statistics indicate a Chinese deficit of $3.5 billion in trading with the United States.

Discrepancies in trading partner data are not uncommon, but the gap between Chinese and U.S. statistics has widened significantly since 1981. The gap has increased especially rapidly between U.S. statistics on imports from China and Chinese statistics on exports to the United States—from 27 percent of the U.S. export value in 1981 to 66 percent in 1989. The widening gap is largely the result of rapid growth in re-exports of Chinese goods through Hong Kong. As Hong Kong becomes an increasingly important entrepôt for China, the discrepancy between U.S. and Chinese trade statistics is likely to become even greater.

THE BUSINESS CLIMATE IN CHINA

While the Chinese government has made considerable progress in improving the business environment in China over the past decade, foreign companies continue to encounter many difficult problems. Of particular concern to foreign investors are a lack of access to the domestic market, foreign exchange controls, the inconvertibility of renminbi, difficulties in sourcing materials in China, poor quality control, inadequate infrastructure, and shortages of skilled labor. There also is discontent among foreign investors about weakness of intellectual property rights protection, a lack of transparency of administrative and legal procedures and regulations, inefficient government bureaucracies, and the high cost of doing business in China.

Widespread investor complaints caused the Chinese government to issue "Provisions for the Encouragement of Foreign Investment," in October 1986. The Provisions' 22 articles provide preferential treatment for foreign investment enterprises in general and high-technology and export-oriented enterprises in particular. The investment climate began to improve following the promulgation of the Provisions and other measures taken by the Chinese government.

The recent austerity program and political turmoil dealt foreign investors a severe blow. Economic recentralization and increased administrative controls resulting from the austerity policy made the investment environment much more restrictive. Political events since June 1989 have further shaken foreign investors' confidence, and greatly complicated the task of operating ventures in China.

In addition to investment problems, the number of trade disputes between U.S. companies and Chinese entities has increased over time. These disputes cover a wide range of cases, from nonfulfillment of contractual terms to infringement of trade marks. These are further complicated by a lack of effective mechanisms for dispute resolution. Although third-party arbitration is allowed in some business disputes, China does not recognize a foreign company's right to take the Chinese government to international arbitration.

IV. GOVERNMENTAL RELATIONS

A DECADE OF DEVELOPMENT

In the decade after the establishment of diplomatic relations in 1979, much progress was made in developing a framework for normal commercial relations between the United States and China. This framework was built largely through government-to-government agreements and consultations.

An overall Trade Agreement was concluded in 1979, providing reciprocal nondiscriminatory treatment for each country's products. This was followed by agreements, signed in the early 1980s, in areas such as science and technology cooperation, textiles, grain trade, aviation, nuclear power, maritime relations, taxation, and industrial cooperation.

In addition, three ministerial level joint commissions—the Joint Commission on Science and Technology, the Joint Economic Commission (JEC), the Joint Commission on Commerce and Trade (JCCT) were established. Prior to 1989, these commissions met annually, providing fora for discussing relevant bilateral issues.

The Science and Technology Commission was co-chaired by the Science Advisor to the President on the U.S. side, and the Minister-in-Charge of the State Science and Technology Commission on the Chinese side. The two countries signed 27 agreements on scientific exchange, including the highly successful Dalian Management Program, which introduced Chinese managers and executives to modern management techniques.

The JEC was co-chaired by the U.S. Treasury Secretary and the Chinese Minister of Finance. It focused on financial, banking, taxation, and other macroeconomic issues.

The JCCT was co-chaired by the U.S. Secretary of Commerce and by one of China's Vice Premiers or its Minister of Foreign Economic Relations and Trade. It provided a forum for high-level consideration of bilateral trade issues and served as a vehicle for promoting economic relations. Under JCCT auspices, legal seminars were conducted annually, and executive level trade missions were exchanged in accordance with the U.S.-China Industrial and Technological Cooperation Accord signed in 1984.

Between 1979 and 1989, there were numerous exchanges of visits by high-level government officials. Frequently, trade issues also were discussed during these visits.

In addition to bilateral consultations, commission meetings, and agreements, trade issues were handled through multilateral channels. In the 1980s, China joined the World Bank, the International Monetary Fund, and the Asian Development Bank, adhered to several principal multilateral conventions, and was admitted to the Multilateral Fiber Arrangement. In 1986, China began the process of negotiating full membership in the General Agreement on Tariffs and Trade (GATT). Since then, the U.S. and China have conducted five rounds of bilateral negotiations on the latter's accession to GATT.

THE IMPACT OF TIANANMEN

The decade-long progress in government-to-government commercial relations was disrupted by the Tiananmen incident. The U.S. government responded to the political repression in China by imposing a number of suspensions on important elements in bilateral relations, including those related to trade. In the wake of Tiananmen, the Administration announced on June 5, 1989, and then again on June 20, a series of measures suspending certain bilateral programs. Later in the year, Congress passed several bills containing provisions to legislate some of the existing sanctions announced by the Administration and impose additional ones.

The trade-related programs and activities which have been suspended since Tiananmen as a result of the actions taken by Congress and the Administration are summarized as follows:

- With the exception of the Scowcroft-Eagleburger missions, official exchanges above the assistant secretary level have been stopped.
- Government-to-government sales and commercial exports of weaponry have been halted.
- Consideration of increased liberalization of COCOM restrictions for China has been suspended. In addition, the United States, along with other COCOM members, has postponed implementing a distribution license procedure for China.
- Both the Overseas Private Investment Corporation and the Trade and Development Program have suspended all new activities in China.
- In December 1989 the President made a national interest determination that waived legislative prohibitions on Export-Import Bank activities in China. Since Tiananmen, Eximbank's financing of U.S. business activities in China has been held at a reduced level. Financial commitments have been approved on a case-by-case basis only where project decisions are

imminent and where U.S. business would lose out in the absence of Eximbank support.

- Since December 1989 when the President waived the restriction on the export of communications satellites to be launched by China for third-party customers, no action has been taken to permit further satellite exports to China.
- No export licenses for crime control and detection instruments have been issued.
- The United States has opposed new loans to China by international financial institutions, except those for projects meeting basic human needs. At the Houston Summit in July, the Group of Seven announced that it agreed to explore further whether there are other World Bank loans that will contribute to the reform of the Chinese economy, especially loans that will address environmental concerns.

This year has seen an intense debate in the United States regarding the extension of China's Most Favored Nation (MFN) status, which allows nondiscriminatory tariff treatment for Chinese exports to the United States, and Export-Import Bank financing for U.S. exports to China. The reciprocal granting of MFN treatment was the main pillar of the U.S.-China Trade Agreement signed in 1979, marking the beginning of the normal commercial relationship between the two countries. Under the Trade Act of 1974, as a nonmarket economy country China's MFN status must be renewed annually by a Presidential determination stipulating that China meets the freedom of emigration requirements set forth in the Jackson-Vanik Amendment, or by a Presidential waiver of these requirements. China received such a waiver in previous years. This year, however, strong pressure emerged from some in Congress to oppose renewal of China's MFN status.

On May 24, the President informed the Congress of his determination to extend the MFN waiver for China for another year. Since then Congress has held a series of hearings. Congressional concern about the human rights situation in China remains high, and legislation placing conditions on MFN extension is still under consideration.

Despite the suspension of high-level governmental exchanges, consultations on commercial matters have continued at the working level. Since October 1989, two embassy-based working groups—one on trade and investment, the other on intellectual property rights—have been established under JCCT auspices. These groups have met periodically in Beijing. In the meetings, U.S. officials from the Department of Commerce and American Embassy in Beijing discussed general concerns of U.S. business with Chinese trade officials, and presented specific individual company problems for resolution by the Chinese.

V. PROSPECTS

Despite the post-Tiananmen disruptions in bilateral commercial relations, the volume of U.S.-China trade continues to grow. This growth, however, is largely driven by U.S. imports. U.S. imports from China in the twelve-month period ending June 1990 rose by 39 percent over July 1988–June 1989 levels, while U.S. exports to

China increased by only 3.4 percent. As a result, the U.S. deficit with China reached $8 billion, compared to $4.4 billion a year earlier.[11]

China had already started an export drive before Tiananmen under the austerity program. This drive has been accelerated in an effort to generate more foreign exchange earnings to make up post-Tiananmen losses in these earnings from nontrade sources such as tourism, foreign direct investment, and external borrowings. Export growth is likely to be fueled further by the establishment of an increasingly large number of labor-intensive export factories in China by Hong Kong and Taiwan investors. Since-many markets have imposed import restrictions on light manufactured products, the lucrative and more accessible market of the United States has become the prime target for China's export promotion efforts.

China will continue to rely on the United States as a major supplier of agricultural commodities, raw materials, aircraft, and other high-technology products. These are the products which China needs to make up for domestic shortfalls and to develop its priority sectors (transport, telecommunications, energy, and raw materials). In other product areas, prospects for U.S. sales will be limited by the generally restrictive import policy that China is presently pursuing, and by the stiff competition from third-country suppliers with government-backed soft loans.

Barring unexpected changes, current trends of rapid growth in imports and sluggishness in exports will likely continue in the next few years. The result will be rapid increases in the U.S. trade deficit with China. At $6.2 billion in 1989, the U.S. deficit with China was the sixth largest bilateral deficit world wide, moving up from the ninth largest in 1988. In the first six months of this year, the U.S. deficit reached $4.1 billion—fourth largest worldwide and 83 percent higher than for the same period of the previous year. If current trends continue, China could rank second or third among the countries with whom the United States has largest trade deficits this year or next. These rapid increases have been of great concern to the United States, and are likely to become a priority issue in the future agenda for bilateral discussions.

Since Tiananmen, U.S. investors' interest in China has dropped precipitously. China's leaders have repeatedly stated that their government's decade-long foreign investment policy remains unchanged. Recently the National People's Congress approved amendments to the joint venture law permitting foreigners to become chairman of the board of a joint venture, eliminating mandatory time limits on contracts for certain types of ventures, and providing protection from nationalization. The new Pudong development project, a 350 square-kilometer area in Shanghai opened to foreign participation, has been pushed forward aggressively. Meanwhile, the open development zones in Guangdong, Fujian, Hainan, Tianjin, and Dalian have continued to expand. Despite these developments, U.S. investment in China is not expected to resume growth soon due to investors' concern over the political future of China.

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[11] U.S. exports to China totaled $5.4 million during the period July 1988 to June 1989 and $5.6 million during the period July 1989 to June 1990 while U.S. imports from China were estimated at $9.8 million and $13.6 million during the respective periods.

In the absence of substantial growth of new U.S. investment in the next few years, the main issue in U.S.-China investment relations is likely to focus on problems confronted by the existing U.S. investment ventures in China. The current austerity program, accompanied by greater recentralization of economic authority and increased use of administrative methods to manage resource allocation, have created many difficult operational problems for U.S. invested enterprises, including tight credit and more restricted access to production inputs. U.S. investors also may face a growing lack of transparency in economic decision-making and greater red tape on the part of Chinese bureaucracy under pressure to implement the austerity measures. It will be in the best interest of China to see these problems resolved in order to regain the confidence of existing as well as prospective investors.

Beyond the next few years, U.S.-China commercial relations will be affected by a wide range of factors. First of all, these relations will be determined by the degree of success that both countries have in resolving existing issues. Currently, these issues include economic sanctions, intellectual property rights, the trade imbalance, and the business climate in China. Closely related to the last three issues is access to the Chinese market. Negotiations for a new textile agreement could become contentious next year. In the future, annual renewal of the MFN status may no longer be a routine matter as it was in the first decade of the U.S.-China Trade Agreement. The Chinese also may want to press for negotiations of certain multilateral issues, such as China's GATT membership.

U.S.-China commercial relations also will be affected by both countries' relations with other trading partners. The growing importance of the Soviet Union, Eastern Europe, and Pacific Rim countries in the world economic scene may shift U.S. investors' interest away from China. China also may want to expand commercial relations with these countries, thus reducing trade dependency on the United States. China's growing economic relations with Hong Kong and Taiwan are likely to have a far-reaching impact on its trade with the United States.

The impact of China's expanding economic relations with Hong Kong on U.S.-China trade has already been evident in recent years. Hong Kong is becoming an increasingly important entrepôt for China trade—increasing quantities of Chinese products are reexported to the United States through Hong Kong. (Over 35 percent of Hong Kong's total reexports of Chinese-origin products went to the United States last year.) The movement of labor-intensive light manufacturing projects from Hong Kong to China, especially Guangdong Province, has accelerated the growth of China's exports to the United States. In the last few years, U.S. imports of Chinese light manufactures, especially footwear, toys, consumer electronics, furniture, and leather articles have grown sharply, while U.S. imports from Hong Kong of these products have declined. As 1997 approaches, the year when Hong Kong reverts to Chinese administration, economic ties between the two regions are bound to become closer, affecting further the triangular commercial relationship among Hong Kong, China, and the United States.

A similar pattern of these changing relations is emerging among Taiwan, the Chinese mainland, and the United States. Since 1987, economic relations between Taiwan and the PRC have expanded rapidly. Indirect PRC-Taiwan trade grew from nearly $1 billion in 1986 to $3.5 billion in 1989. During the same period, Taiwanese businesses established several hundred investment projects in the PRC with a contracted value of some $1 billion. Many of these projects involved the movement of small-scale, labor-intensive, and export-oriented operations from Taiwan to the mainland. As a result, some of Taiwan's light manufactured exports to the United States, especially footwear, consumer electronics, umbrellas, and leather products, are declining, in contrast to China's growing exports to the United States of these products. The significance of these changes may be seen in the likelihood that the PRC may replace Taiwan very soon as a trading partner with whom the United States has the second largest bilateral trade deficit. Despite Tiananmen, the number of Taiwan's investors going to China is increasing substantially. The impact of the growing economic relationship between the two sides of the Taiwan Strait on U.S.-China trade is likely to become much greater and more complex in the years ahead.

More fundamentally, the U.S.-China commercial relationship in the long term will be determined by the political environment in China, including the degree of political stability and the types of policies pursued by the Chinese leadership. These political and policy factors may have an important bearing on U.S.-China economic and trade relations in two significant ways. First, they will govern China's basic attitude toward the United States, which in turn will affect bilateral economic ties. Second, they will determine the basic policies regarding China's economic system and development strategy. A return to market-oriented economic reforms would facilitate the process of China's integration with the world economy and enhance the prospects for expanded economic relations with other countries, including the United States.

SINO-SOVIET TRADE IN THE 1980s AND 1990s: POLITICS, PRAGMATISM, AND PROFITS

By Sharon E. Ruwart *

CONTENTS

Page

I. Renewing Trade Ties 913
II. Problems with Purchasing Power 915
III. Localizing Trade Links 915
IV. A New Export: Manpower 917
V. Border Trade Problems 918
VI. Expanding Commercial Links 921
VII. Problems in Partnership 926
VIII. China Perceives a New Threat 927
IX. Pragmatism Will Prevail 929

The Sino-Soviet trade relationship today is dramatically different from that of the 1950s, when the Soviet Union accounted for about 50 percent of China's total trade and provided massive amounts of technical and financial assistance to rebuild China's war-ravaged economy. Today, nearly eight years after bilateral trade relations were formally renewed, the amounts exchanged remain small, since both countries are concentrating on developing sources of hard currency and advanced technology, which neither can offer the other.

While at the national level, Sino-Soviet trade ties chiefly serve to symbolize that state-to-state relations are on solid footing, on the local level renewed bilateral trade has had a much greater impact, largely as a result of recent innovations in trade practices. Unlike the 1950–1970s period, when trade was exclusively a government-to-government affair, today a number of provincial and local organizations on both sides are authorized to trade directly across the border, and to establish cooperative projects and joint ventures. As a result, provincial and border trade has increased at a rapid rate, and dozens of joint ventures are operating in the border areas.

Significant problems hamper commercial relations, however, chief among them the inadequately developed financial and transportation infrastructures in both countries. Unless some of the basic problems, such as currency inconvertibility and transport inadequacy, can be solved, Sino-Soviet trade will remain a small-time affair.

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Aside from the reduced volume of transactions and the localization of commercial links, the major change in Sino-Soviet trade today is how it is affected by the political context in which it takes place. In the 1950s, the USSR was China's Marxist mentor; in the 1960s trade ground to a virtual halt as ideological differences violently split the former socialist comrades. Today, trade has been largely distanced from political disputes. Nevertheless, the contrast between policies in Beijing and Moscow concerning the pace and mechanics of economic and social reform may eventually have an impact on Sino-Soviet trade. The top priority of China's leaders is to preserve social stability, and they fear the pervasive effects of glasnost and perestroika evidenced by the dramatic downfalls of successive East European governments. To help prevent such ideas from infiltrating Chinese society, Beijing would take steps to slow the expansion of commercial contacts on the non-governmental level, particularly on the border.

At this point, however, such concerns are in the background of a commercial relationship that is growing, albeit slowly, and bringing benefits to both sides in the form of needed materials and expertise. For the forseeable future, pragmatism will continue to prevail over politics in trade relations, as both sides prioritize the search for profits.

I. RENEWING TRADE TIES

During the 1950s, the USSR was China's main trading partner, accounting for about half of China's overall imports and exports. Beginning in the early 1960s, however, a variety of ideological, military, and territorial differences cooled the relationship. Soviet technical advisers were recalled, and while the annual government-to-government trade protocols that formed the basis of trade (these do not provide for border trade activities) were signed each year up to 1968, and resumed again in 1970, a number of the later agreements were not completely fulfilled.[1] Though trade never completely ceased, it took nearly twenty years for the political climate to warm up enough to justify resuming a full-fledged trade relationship. With appropriate fanfare and protestations of friendship, the two countries "officially" reopened trade links in 1983.

Since then, trade has grown rapidly. The 1989 bilateral trade agreement totalled \$3.1 billion, a 20 percent increase over 1988 (\$2.6 billion) and 13 times greater than the 1981 total, according to China's State Statistical Bureau.[2] By 1989, the USSR ranked as China's fifth-largest trading partner, though the totals lagged far behind those of Hong Kong/Macao, Japan, the United States, and Germany, accounting for just three percent of China's overall foreign trade.[3]

Since neither the ruble nor the yuan can be converted to hard currency, Sino-Soviet trade is conducted by barter, with commodities valued in neutral Swiss francs according to world market prices. The figures in this paper are given in the currency reported by the original source, whether francs, rubles, yuan, or dollars, with some accompanied by estimates of the US dollar value depending on contemporary exchange rates. The appendix lists ruble, yuan, and Swiss franc exchange rates over time.

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[1] *Soviet-Chinese Relations*, 1945–1970, O.B. Borisov and B.T. Koloslov. Bloomington: Indiana University Press, 1975, pp. 64–72, 314.

[2] Cited in Hong Kong *Kuang Chiao Ching* in Chinese No. 199, 4/16/89; FBIS–CHI–89–076, 4/21/89, pp. 6–10.

[3] The Journal of Commerce, 5/10/89, p. 4A

Despite the rapid expansion of trade volumes, the types of commodities exchanged remain much the same today as in the 1960s. China chiefly exports foodstuffs, light industrial goods, and production materials in exchange for power-plant equipment, steel, and transport machinery. A Xinhua news agency report claimed that during 1981–89, China exported to the USSR 600,000 metric tons of meat, 630,000 tons of fruit, 8,000 tons of filature silk, 970 million Swiss francs' (SFr) worth of nonferrous metals and minerals, SFr3 billion worth of soybeans, corn, and peanuts. China also exported unspecified amounts of light industrial goods. In return, China received from the USSR 7.8 million metric tons of rolled steel and pig iron, 17 million cubic meters of logs and timber, 3.7 tons of urea, SFr2 billion[4] worth of nonferrous and precious metals, 119,000 cars and vehicles, and 57 planes.[5]

As the list indicates, trade fulfills certain complementary needs. The Soviets are strong in production of chemical fertilizer, of which China cannot get enough, and heavy equipment manufacturing, especially power plants. It makes sense for energy-needy China to continue to acquire Soviet technology through barter, especially since the USSR can also help renovate many of the plants built by Soviet engineers in the 1950s. China provides a wide variety of consumer goods ranging from textiles to household appliances, along with many types of fresh and canned food, to the Soviet Far East, which even more than the rest of the USSR suffers from a chronic shortage of many basic consumer commodities.

As in earlier years, the bulk of bilateral trade is conducted on a government-to-government basis. Each year, the two countries' foreign trade ministries sign an agreement setting an aggregate monetary total and outlining approximate amounts of the main commodities to change hands that year. For example, the 1989 "commodities exchange and payment protocol" signed in March 1989 set total trade at $3.1 billion (a 17 percent increase over the 1988 target). China was to export tungsten ore, soybeans, corn, meat and meat by-products, knitwear, thermos flasks, handicrafts, and machinery, in exchange for steel products, nonferrous metals, wood, fertilizer, generators, electric locomotives, cars, airplanes, and refrigerators.[6] The 1990 trade protocol was set at a total of SFr5 billion,[7] and specified Soviet exports of 17 planes, 10 helicopters, and thermal power equipment, among other items.[8]

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[4] SFr970 million = US$505 million; SFR3 billion = US$1.56 billion; SFr2 billion = US$1.4 billion. Calculated using an average of SFr1.92 : US$1 for the period 1981–89, quoted by the International Monetary Fund (IMF).

[5] Beijing Xinhua Domestic Service in Chinese, 4/19/90; FBIS–CHI–90–078, 4/23/90, pp. 18–19.

[6] Beijing Xinhua in English, 3/3/89; FBIS–CHI–89–041, 3/3/89, p. 11.

[7] SFr5 billion = US$3.1 billion. 1989 exchange rate = SFr1.63 : US$1 (IMF statistics).

[8] Beijing Jingji Ribao in Chinese, 4/21/90, p. 1; FBIS–CHI–90–086, 5/3/90, pp. 3–5.

II. PROBLEMS WITH PURCHASING POWER

So far, exchanging cement for silk and timber for textiles has worked out more or less to both sides' advantage, especially in terms of meeting local needs in the border areas. The lack of convertible currencies places fundamental constraints on Sino-Soviet trade, however, for two reasons.

First, as both countries strive to make their economies more efficient and market-sensitive by decentralizing planning and trading functions, provincial organizations and even some factories have become responsible for their own profits and losses. Thus they have both greater authority and greater incentive to sell their products to hard-currency purchasers instead of handing them over to the central government to fulfill official trade protocols. As a result, Sino-Soviet trade has actually declined in real terms over the past two years, even as the totals set by annual protocols have increased. For example, 1989 trade fell short of the $3.1 billion target, totalling only $2.4 billion. This was even less than the $2.6 billion in trade actually concluded in 1988.[9]

The second, related, problem is quality. Both countries prefer to save their best products for hard-currency customers. As one Chinese economist at a Beijing research institute noted about barter trade, "We only sell each other things that we can't sell for foreign exchange. They send us low-quality wood, and we send them second-class canned food." [10] With a reputation for shoddy goods, neither country is in a good position to withstand competition for each other's markets—and despite carrying higher price tags, goods from the United States, Japan, and other Asian countries are becoming increasingly popular even in remote regions of both countries.

III. LOCALIZING TRADE LINKS

Despite the problems, there are a number of bright spots in bilateral trade, and one of them is the rapid expansion of commercial links along the 7,500 km Sino-Soviet border. Reliable border trade statistics are virtually impossible to come by given the small size of most border transactions and the fact that most of them take place outside official trade channels, so all figures must be treated with caution. Nevertheless, both sides agree that border trade has been growing even faster than overall trade in this decade. Jingji Ribao asserts, for example,[11] that 1983 border trade totalled SFr16 million and leapt to a total of SFr1.3 billion in 1989.[12] China Economic News describes the 1988 border trade total of $274 million as a 210 percent increase over the 1987 figure.[13]

How does border trade differ from the centrally planned variety? The bulk of the commodities exchanged is locally sourced, and represents many of the same items stipulated in the central protocols:

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[9] *The Journal of Commerce*, 4/4/90, p. A1.

[10] "China and the Soviet Union Weigh Economic Cooperation Proposals;" supplement to the *Asian Wall Street Journal Weekly*, 5/15/89.

[11] Beijing Jingji Ribao in Chinese, 5/21/90, p. 1.

[12] SFr16 million = US$9.78 million; SFr 1.3 billion = US$790 million. (IMF 1989 exchange rate statistics).

[13] China Economic News in English, 4/17/89, p. 5.

fertilizer, cement, timber, and power station equipment from the Soviets, and garments, light industrial goods, and food—such as soybeans, peanuts, potatoes, apples, and frozen beef—from the Chinese. The amounts exchanged are generally quite small—measured in units and truckloads—and are targeted toward specific local needs. For example, a story recounted by Beijing's Liaowang weekly describes a harried Soviet official from the Amur Oblast border region pleading with the head of the Heihe Trading Co. to send a shipment of 30,000 colored scarves for sale to the local "female comrades" for Women's Day (the scarves were duly procured and reportedly sold out in two days).[14] Chinese border traders also send over wristwatches, brooches, shoes, and hats for the local female comrades, while a large proportion of Heilongjiang's Soviet imports consists of chemical fertilizer for local use.[15]

Several factors are responsible for the rapid increase in border trade, the most obvious of which is geography. Three of China's largest provinces—Heilongjiang, Inner Mongolia, and Xinjiang—border the USSR, along with a tiny section of Jilin. These areas have for centuries traded across the Ussuri and Amur rivers as well as across the long land border to the west. The Soviet regions bordering China include the small Tajikistan, Khirgizia, and Kazakhstan soviet socialist republics to China's west and the enormous and relatively wealthy Russian Soviet Federative Socialist Republic encompassing resource-rich Siberia. Not surprisingly, China's northern provinces have taken the lead in reestablishing trade with the USSR; one story claims that the first "official" transaction was a shipment of Harbin watermelons sent across the Amur in 1983 in exchange for Soviet fertilizer.[16] True or not, the tale accurately prefigures Heilongjiang's leading role in border trade. Nearly 100 towns and other small settlements in Heilongjiang face Soviet counterparts directly across the Amur and Ussuri rivers, making for natural trade links. Vladivostok and Khabarovsk, the only two cities in the entire Soviet Far East with populations of over 500,000, are the principal ports for Sino-Soviet trade, and both are linked by waterways to Heilongjiang's capital city, Harbin.

The most successful trade port in Heilongjiang is Heihe, which faces Blagoveshchensk across the Amur. The two cities are the largest in the region after Khabarovsk, Vladivostok, and Harbin. Blagoveshchensk is connected by a 109-km feeder railway to the main trans-Siberian line across the USSR, which allows imported goods to be transshipped inland. Heihe's 1989 trade with the USSR reportedly totalled SFr150 million,[17] and the volume of traded commodities reached 62,000 tons.[18]

Other major trading ports in Heilongjiang include Suifenhe City, a port city north of Vladivostok along an arm of the Ussuri River (a highway between the two cities opened in March 1990); [19] Tong-jiang, Fujin, and Jiamusi, all located along the Songhua Jiang, an offshoot of the Amur River with direct access to Khabarovsk; and Mohe, located along the northernmost point of the Amur. Harbin, which was formally reopened to Soviet trade in July 1989—months after regular shipments had actually resumed—is the largest inland water-land transshipment port in northeast China and is connected with seven large Soviet cities via the Amur and Songhua rivers. Sailing time from Harbin to Khabarovsk is approximately five days.[20] A twice-weekly air route between the two cities was also opened in late 1989.[21] At least six other small counties and townships in Western Heilongjiang were opened to Soviet trade in 1989.[22]

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[14] Beijing Liaowang in Chinese, No. 21, 5/22/89, pp. 22-24, FBIS-CHI-89-114, 6/15/89, pp. 3-5.

[15] Ibid.

[16] Beijing Liaowang in Chinese No. 21, 5/22/89, pp. 22-24; FBIS-CHI-89-114, 6/15/89, pp.3-4.

[17] SFr150 million = US$91.7 million (IMF 1989 exchange rate statistics).

[18] Hong Kong Zhongguo Tongxun She in Chinese, 3/13/89; FBIS-CHI-89-049, 3/15/89, p.3.

[19] China Economic News in English, 2/15/89, p. 17.

As part of a stepped-up export drive, in 1988 Beijing abolished restrictions limiting border trade to small volumes of locally-sourced commodities, and also eased the bureaucratic procedures for transporting goods between provinces. As a result, an ever-increasing percentage of goods exported through China's northern provinces to the USSR comes from further south, such as textiles from Shanghai and electronics from Guangdong. Recognizing the new markets across the border, the southern Chinese provinces have recently begun to develop Soviet trade contacts, attending and hosting trade fairs for Soviet and East European businesspeople and hiring Heilongjiang companies as agents.

Other provincial organizations are cutting out northern middlemen and establishing direct links with the Soviets. In March 1989, for instance, a delegation from Fujian Province held trade talks in Heilongjiang directly with Soviet traders ranging from the Ministry of Chemical Industry to the Vladivostok Fruit and Vegetable Co. They ended up with three barter agreements to exchange Chinese floor tiles, ceramics, filling station equipment, tangerines, and oranges for Soviet plastic agricultural film, gasoline and diesel oil, chemical raw materials, and rolled steel scrap.[23] A Chinese source noted in June 1990 that over 10 large corporations in the Shenzhen Special Economic Zone are doing business directly with the USSR, chiefly exporting electrical goods. The Saige Group, for example, has exported 80,000 tape recorders and 20,000 color TVs. Other Shenzhen companies have sold home electrical appliances, ground satellite receiving systems, mini-computers, clothing, and cars.[24]

IV. A New Export: Manpower

Demonstrating their flexibility in identifying new markets for abundant local resources, local-level Chinese organizations have in the past two years begun contracting out Chinese laborers to work on projects in sparsely populated Siberia. With only 30 million people in the entire vast region, the USSR desperately needs manpower to tap Siberia's wealth of natural resources, including metals and minerals, timber, petroleum, and arable land. In past years the USSR has imported laborers from North Korea, Vietnam, Cuba, and East European countries, but China's proximity and abundance of underemployed workers makes it a more attractive source of manpower. In 1988, organizations in the three border provinces began sending laborers as construction workers, lumberjacks, vegetable growers, and railroad repairmen. They are generally paid as much as or more than Soviet workers, and since the ruble is nonconvertible, the Soviet companies often pay in kind. The Harbin company that sent 300 Chinese workers to the Khabarovsk diesel plant in 1989-90, for example, will be paid for their services in diesel engines, which will presumably be sold and the earnings distributed to the workers in Chinese currency.[25] Another typical agreement called for Suifenhe City to send 54 mechanics to a Soviet refrigerator assembly plant. For one year's work each Chinese would receive RMB7,000 (an astronomical sum that should perhaps be read with caution) and a new refrigerator.[26] Inner Mongolia and Xinjiang have sent many small groups of agicultural workers across the border, and Liaoning and Jilin have sent lumbermen to work in the vast Siberian forests. Accurate figures are impossible to establish, but numerous Chinese sources report that up to 10,000 workers were sent to the USSR in 1988, 15,000 in 1989, and up to 20,000 may go in 1990. A central-level Sino-Soviet agricultural cooperation committee has even discussed the idea of sending a veritable army of Chinese workers all the way to the Soviet Ukraine! [27]

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[20] Harbin Heilongjiang Provincial Service in Mandarin, 7/10/89; FBIS–CHI–89–132, 7/12/89, p. 8.

[21] Ibid., 9/22/89, FBIS–CHI–89–184, 9/25/89, p. 6.

[22] Hong Kong Zhongguo Tongxun She in Chinese, 4/10/89, FBIS–CHI–89–070, 4/13/89, p. 8.

[23] Fuzhou Fujian Ribao in Chinese, 3/16/89, p. 2; FBIS–CHI–89–058, 3/28/89, p. 3.

[24] Beijing Zhongguo Xinwen She in English, 6/12/90; FBIS–CHI–90–114, 6/15/90, p. 4.

V. BORDER TRADE PROBLEMS

The rapid expansion of border trade has been accompanied by problems reminiscent of those that plagued China's southern and coastal provinces in the wake of a sudden surge in foreign trade in the mid-1980s. While in 1983 only a single organization in northeast China was permitted to trade with the USSR, today roughly 190 organizations throughout the country may do so.[28] In the rush to do business over the border, many organizations contracted to supply goods to the Soviets that ultimately could not be obtained from interior provinces, and many agreements went unfulfilled. Even worse, from the standpoint of Beijing's planners, many of these traders sought a competitive edge by lowering the prices of exports and jacking up the prices of imported goods.[29] As in the southern provinces earlier, Beijing sought to eradicate speculative trade activity, embarking in 1989 on a "rectification" program for organizations trading with the USSR. While few units lost their trading privileges as a result, each was assigned to one of 20 or so trading groups that were allotted loose import and export targets in an effort to keep trade monitored and balanced. In addition, a number of regulations were passed defining acceptable border trade practices.[30]

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[25] "Peace Along the Ussuri," by Michael Dobbs. *The Washington Post*, 5/9/89, p. A1.
[26] Hong Kong Zhongguo Tongxun She in Chinese, 5/3/89, p. 10.
[27] Bejing Xinhua in English to North America, 9/15/89; FBIS-CHI-89-184, 9/25/89, pp. 6-7.
[28] Beijing Guoji Shangbao in Chinese, 6/24/89, p. 3; FBIS-CHI-89-184, 9/25/89, pp. 6-7.
[29] Ibid.
[30] Ibid.

Another problem with southern precedents is rivalry between the northeastern border provinces and those of these interior. Since 1988, when all provinces were authorized to trade with the USSR, the southern provinces have come to resent the natural advantages of proximity enjoyed by their northern compatriots. Shanghai in particular, which is a major producer of the kinds of light industrial goods in demand in the USSR—and which believes Guangdong's spectacular success in foreign trade has come largely at its expense—resents Heilongjiang's dominant position in border trade. These feelings boiled over during a large East Bloc trade fair held in Harbin in June 1990. After the first four days of the two-week fair, the Northeastern Trading Group consisting of the three border provinces had concluded SFr260 million worth of contracts, with Heilongjiang alone claiming SFr124 million of the total. The East China Trading Group, including Shanghai, Jiangsu, and Zhejiang, had concluded just SFr24 million worth of transactions—Shanghai's total was a mere SFr120,000.[31] Shortly after these figures were announced, Shanghai authorities publicly accused Heilongjiang traders and officials of actively blocking access by other Chinese to the 2,000 Soviet businessmen at the fair. This was hardly consistent, the Shanghainese pointed out, with the official border trade policy of "cooperating with the south to open up the north." [32] The gravity of the situation was emphasized when the Heilongjiang provincial governor made a public apology to Shanghai.[33]

Though Sino-Soviet border trade is probably not in itself significant enough to precipitate protest against central trade policies by disgruntled areas such as Shanghai, it highlights and exacerbates the uneven distribution of foreign trade benefits among Chinese provinces. Chinese authorities recognize that this situation is a potential threat to social stability, but have not yet been devised a way to address it while continuing to promote exports. As a result, organizations on the border may be vulnerable to stricter controls in the future as authorities attempt to keep foreign trade benefits balanced on a national level.

The USSR's internal economic problems have also contributed to border trade frictions in the past year. In 1989, the USSR implemented a licensing system to restrict exports of nearly 200 types of goods, including cement, timber, fuels, metals, and fertilizer. The new system is meant to stabilize the domestic supply of key materials in the face of a dramatic drop in national productivity caused by everything from workers' strikes and transportation bottlenecks to general lack of motivation and enthusiasm for reforms. The Soviet "rectification" drive also reduced the number of organizations authorized to trade abroad from 189 to 26.[34]

According to a Hong Kong source, the tightening measures have had a "severe" effect on 1990 border trade, especially in Heilongjiang. The source notes that because Soviet companies had trouble obtaining licenses for contracted goods, only one-tenth of all 1989

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[31] SFr260 million = US$177 million; SFr124 million = US$84.8 million; SFr120,000 = US$82,000. Calculated using June 1990 exchange rate of SFr1.462 : US$1 (IMF).

[32] *Shanghai Jiefang Ribao*, 6/11/90, FBIS-CHI-90-115, 6/14/90, p. 13.

[33] Hong Kong Agence France Presse, 6/15/90, P. 6.

[34] Hong Kong *Zhongguo Tongxun She* in English, 6/20/90; FBIS-CHI-90-120, 6/21/90, p. 5.

Sino-Soviet contracts had been finalized (treat the statistics with caution), and that several million Swiss francs' worth of goods bound for China have been stranded in Soviet ports for lack of licenses. The report goes on to say that the booming port of Heihe reported a Soviet trade deficit of SFr4 million [35] last year, and attributes the shortfall directly to the new licensing system.[36]

In response to the "confusion" on the Soviet side of the border, China's Ministry of Foreign Economic Relations and Trade (MOFERT) began to review the border trade situation in mid-1990, and reportedly plans to reduce the number of companies authorized to trade with the USSR from the current 190 to 26. Mirroring the Soviet move, MOFERT may also institute a permit system for the export of "essential" items.[37]

Another major roadblock to contract fulfillment is the inadequacy of transport links between the two countries. Trade between border settlements thrives in winter, when trucks can be driven across the frozen rivers. But two-thirds of bilateral trade is transported by rail over longer distances, and facilities at the principal northern trading ports have not been renovated since the 1950s. They lack mechanized loading equipment, containerization facilities, and warehouses. Incidents of goods being damaged during shipping or spoiled by weather while sitting on docks and in railyards are all too common. The 6-inch difference in width between Soviet and Chinese rail guages contributes to delays and potential damage, since all goods have to be reloaded onto different railcars upon reaching the border.[38] Water transport links between cities are rapidly expanding, but without concurrent infrastructure improvements in the ports themselves, increasing the number of cargo vessels will only worsen the congestion.

To address these problems, in 1986 the two countries revived the central-level transport working group that met during the 1950s to develop plans for improving links. The centerpiece of the current effort is the construction of a 250-mile railway between Urumqi in Xinjiang and the Soviet border, where it will link up with a major East-West rail route.[39] An agreement on the project was reached in 1988 and work on the railway is proceeding, but even when completed it will only partially alleviate the bottlenecks hampering trade.

The recent changes in the Soviet trade system, along with serious transportation problems, have contributed to a slowdown in border trade growth in 1989–90,[40] and will likely constrain trade for at least several years. This may not be such a bad thing, however. Raising the rate of contract fulfillment by making sure before contracts are signed that appropriate licenses can be obtained and transportation can be arranged will do more to increase the volume of goods actually exchanged than racking up on paper new records for total trade.

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[35] SFr4 million = US$2.4 million (1989 IMF exchange rate).

[36] Hong Kong *Zhongguo Tongxun She* in English, 6/20/90; FBIS-CHI-90-120, 6/21/90, p. 5.

[37] Ibid.

[38] "Partners in Austerity," by Deborah Diamond-Kim. *The China Business Review*, May–June 1987, pp. 12–20.

[39] Ibid.

[40] Hong Kong *Zhongguo Tongxun She* in English, 6/20/90; FBIS-CHI-90-120, 6/2/90, p. 5.

VI. EXPANDING COMMERCIAL LINKS

Since the mid-1980s, the Sino-Soviet economic relationship has again expanded to include other forms of cooperation besides trade. It is important to note, however, that these links are a far cry from the close collaboration that characterized the 1950s Sino-Soviet alliance. Rather, they are part of a network of protocols China has established with many trading partners in recent years. These are intended as much to announce and ratify friendly relations as to promote actual economic interchange.

In 1985, the two countries signed a five-year economic and technological cooperation agreement, the first since the 1950s, outlining a joint construction plan for 33 major industrial projects in China. These include renovations of 17 key facilities built by the Soviets in the 1950s.[41] As of 1990, according to a Chinese source, 13 of the 33 projects had been cancelled; negotiations reportedly continue for another eight; while contracts have been signed for the renovation of the remaining 12 projects, all built with Soviet aid: the Harbin Flax Mill (1952), the largest linen mill in China; the Anshan Steelworks in Liaoning, China's largest iron and steel complex (rebuilt with Soviet aid in the 1950s); the Baotou Steelworks in Inner Mongolia (1950s); the Jiamusi Paper Mill (1954–57), China's largest; the Nancha Timber Hydrolysis Mill in Heilongjiang (1957); the Fushun Aluminum Plant in Liaoning (1954); the Jixian Power Plant (details not available); the Luoyang Bearing Plant in Henan, China's largest (1953); the Wuhan No. 3 Blast Furnace and the Wuhan Aluminum Plant (details not available); and transmission lines in two unspecified power plants, one of which is probably the Xi'an Power Rectifier Plant in Shaanxi (1953).[42]

Work has reportedly begun on at least a few of these projects, including the Harbin flax mill,[43] though some of the other contracted renovations may not actually take place. Soviet technology is not all that attractive to China, whose appetite for the state-of-the-art has been whetted by contact with the West. In addition, the vast amounts of time, money, and cooperation needed to complete these ambitious projects may cause them essentially to collapse under their own weight.

The multi-year agreement also calls for developing new projects. As a result, interest in joint power generation projects, an area of cooperation dating back to 1950, was revived in 1988, when the two sides negotiated a Soviet loan to finance the purchase of Soviet power equipment by the Nanjing Government and the Huaneng International Electric Power Generation Co. According to the 1988 agreement, the USSR would be repaid in unspecified countertrade for two sets of generating equipment to be installed in Nanjing.[44]

A similar countertrade deal was also discussed in 1989 involving the import of a nuclear power plant to be installed in two phases on the coast of Liaoning province.[45] In addition, the South China

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[41] Beijing in Russian to the USSR, 12/29/88; FBIS–CHI–88–002, 1/4/89, p.12.

[42] Author interview with Zhang Deguang, counselor, Embassy of the PRC in Washington, DC; May 1990.

[43] Hong Kong Liaowang Overseas Edition in Chinese No. 19, 5/8/89, pp. 25–26; FBIS–CHI–89–095, 5/18/89, pp. 28–29.

[44] Ibid.

[45] Hong Kong Agence France Presse, 3/14/90; FBIS–CHI–90–070, 3/14/90, p. 3.

Morning Post in April 1989 reported that China was "likely" to import Soviet nuclear technology for the second atomic plant at Daya Bay in Guangdong Province, using similar countertrade arrangements.[46] Finally, a feasibility study was reportedly completed in mid-1989 for a joint hydroelectric plant to be built on the Amur River. The cost of the 2 billion yuan project would be shared equally and would be the biggest Sino-Soviet joint venture to date.[47] The current status of this project is unclear.

Petroleum development has also been added to the list of recent cooperative projects. In 1988–89 a series of talks took place outlining plans for Chinese assistance in developing Soviet petroleum resources on Sakhalin Island. Under discussion are two 600-km oil pipelines and one natural gas pipeline to be built between Sakhalin and Komsomolsk on the Amur. Natural gas might then be exported from Komsomolsk to China. The Chinese hope to send engineers and manual laborers to help build the oil fields and pipelines.[48]

The Soviets, in turn, are offering assistance on at least one Chinese project, a 135-km liquefied coal pipeline planned for Shanxi Province. Both sides reportedly have completed pre-feasibility studies on the 219 million yuan project, and expected to turn in full-scale studies by mid-1990.[49]

As projects continued to be developed under the first agreement, a second one, covering the 1990–2000 period, was signed during Premier Li Peng's April 1990 Moscow visit. The "Outline on Long-Term Cooperation in the Economic, Scientific, and Technical Fields" encourages cooperation in the nonferrous metals, petrochemicals, natural gas, agriculture, transportation, and public health areas (though no projects were specified in the agreement). In addition to this agreement, Li and Soviet Premier Nikolai Ryzhkov signed five other accords further broadening and defining the economic relationship: an agreement calling for the USSR to extend commodity loans (including rails, timber, trucks, and diesel oil) to China to finance the construction of the Xinjiang-Kazakhstan railway (this was a formal ratification of the accord reached in 1988; the terms call for China to repay the loan through exports of food and industrial products); a memorandum on a loan allowing China to import Soviet power equipment and formalizing the intention to build jointly a new nuclear power plant; an agreement to cooperate in the peaceful exploration of space; a consultation accord between the two foreign ministries; and an agreement that China will offer credit toward the Soviet purchase of Chinese consumer goods.[50]

The consumer-goods credit harks back to the 1950s, when the USSR extended to the Chinese numerous credits for the purchase of industrial equipment, agricultural and consumer goods to help rebuild the war-ravaged economy. These agreements were payable in barter trade.[51] The Xinjiang railway agreement formalized by

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[46] *South China Morning Post*, 4/3/89, P. 1; FBIS-CHI-89-064, 4/5/89, pp. 39–40.
[47] *Hong Kong Standard*, 4/19/89, p. 7; FBIS-CHI-89-064, 4/15/89, pp. 39–40.
[48] *The Journal of Commerce*, 1/20/89, p. 7B.
[49] Beijing Xinhua in English, 12/21/89; FBIS-CHI-89-245, p. 5.
[50] Beijing Xinhua in Mandarin, 6/25/90; FBIS-CHI-90-124, 6/27/90, pp. 3–5.
[51] Borisov & Koloslov, 1975.

Li Peng in Moscow is an example of this type of arrangement; in fact, it is actually a 20-year-old plan that was shelved during the 1960s turmoil and revived in the mid-1980s as relations warmed.[52] By contrast, the apparent intention is for the new consumer-goods credit to be repaid in cash—not only that, but in hard currency. At a press conference just before his trip to Moscow, Premier Li emphasized that putting Sino-Soviet trade on a hard-currency, cash basis was necessary in order to bring higher quality goods into the exchange, and to give incentives to more local-level organizations to participate in cross-border trade.[53] The new consumer goods credit is apparently meant to pave the way for cash to completely replace barter as of January 1, 1991.

Local resistance to this central directive will likely derail its implementation, however. A few days after the terms of the consumer goods credit were publicized, a senior Heilongjiang party official publicly criticized the Chinese government's position, terming the plan "unworkable" given the shortage of foreign exchange among trading organizations on both sides.[54] In the same article, a MOFERT official agreed that enforcement of this directive would certainly cause trade to decline, at least in the short term. Given publicized local resistance, the absence of follow-up discussions or implementation directives, and Beijing's continuing emphasis on exports, it seems safe to assume that the relationship will continue on a barter basis for the forseeable future.

While the three commercial agreements under the 1990–2000 protocol are already being carried out, the future of cooperation on other long-term industrial projects and in space is less certain. Rather, agreements in these areas serve to "indicate that China and the Soviet Union have earnestly and practically promoted their good-neighborly relations of cooperation based on the five principles of peaceful coexistence." [55] Li's Moscow visit, the first by a Chinese premier in 24 years, provided the perfect occasion to ratify the new relationship, and the agreements served as appropriate vehicles.

Though large joint power and petroleum projects will take years to negotiate and complete, a host of smaller cooperative projects have already been established in the past two years at the provincial and local level. In June 1988, both countries initialled the "Agreement on the Establishment and Development of Trade and Economic Links Between Union Republics, Ministries, Departments, Amalgamations, and Enterprises of the USSR and Provinces, Autonomous Regions and Cities of the PRC," along with the "Agreement on Principles Governing the Establishment and Operation of Soviet-Chinese Joint Ventures." These two documents laid the groundwork for the formation of joint ventures. Two additional agreements signed in July 1990 at the fifth meeting of the Sino-Soviet Trade, Scientific, Economic, and Technological Cooperation Committee also fostered the growth of joint ventures; one accord "protects and encourages investment" in both countries, and the other is a double-taxation treaty. By April 1990, according to MOFERT, the two countries had signed 95 contracts for cooperative projects (including labor services) and 18 joint venture agreements with a total value of $240 million, and held negotiations on up to 300 other projects in a variety of areas. MOFERT estimates that 95 percent of the agreements are concentrated in border areas and managed directly by enterprises.[56]

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[52] Diamond-Kim, 1987.

[53] Beijing Xinhua in English, 3/31/90; FBIS-CHI-90-065, 4/4/90, p. 5.

[54] *South China Morning Post*, 4/19/90.

[55] Beijing Xinhua in Mandarin, 6/25/90; FBIS-CHI-90-124, 6/27/90, pp. 3–5.

Virtually all of the ventures are small-scale manufacturing projects and local service enterprises. The scope and terms of the first Sino-Soviet manufacturing joint venture to officially commence operations, in November 1989, typify many of the cooperative agreements. The Tashkent Thermos Flask Factory, established in the USSR, uses Chinese technology and will be jointly run by Xinjiang and the Soviet side for a term of 10 years.[57]

As might be expected, Heilongjiang's Heihe City took an early lead in establishing joint projects with Soviet partners. By May 1989, Heihe had reportedly concluded 49 joint-venture agreements, including a restaurant, factories for making soft drinks, fiber board, washing machines, and plywood, and a color photograph finishing center, all to be set up in Blagoveshchensk. Joint projects in Heihi include a coffee shop and factories making viscose fiberboard and chopsticks. Three processing projects for leather, wood flooring, and wood fiber, were reported in trial operation.[58]

Highlighting the Soviet craving for consumer electronic goods are several reported agreements establishing factories to make radio and video cassette records in the USSR. For example, the Yancheng Radio Plant in Jiangsu Province and Kargan Oblast of the Kazakhstan SSR will jointly construct a radio-cassette recorder plant using Chinese technology and know-how. The entire output, eventually planned for 100,000 units per year, is destined for the Soviet market.[59] Another agreement to produce video cassettes and recorders was reported in June 1990 between China's aerospace ministry, its subsidiary, the Shenzhen Zhonghang Enterprise Group, and the USSR air ministry. This project will also use Chinese equipment and expertise to produce units for the Soviet market. The Chinese side will be repaid in spare parts for use in spaceflights.[60]

An agreement for what was described as "the most technologically advanced joint venture" to date was signed in August 1990 and was set to open in November 1990 in Tyumen, USSR. The 10-year, $3.4 million venture will produce electric typewriters, using Chinese production equipment and parts, with Russian and English alphabets. The Chinese partners are the Beijing Qidi Computer Technique Developing Corp. and the Harbin Foreign Trade Corp.; their Soviet counterparts are the Commercial Center of Tyumen and the Tobolsk Oil & Chemical Co. All output, planned at 20,000-30,000 units per year, will be sold in the USSR and Eastern Europe.[61]

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[56] Beijing Xinhua in English, 4/18/90; FBIS-CHI-90-075, 4/18/90, p. 7.

[57] Hong Kong *Zhongguo Tongxun She* in Chinese, 5/15/89; FBIS-CHI-89-094, 5/17/89, pp. 35.

[58] Beijing Xinhua in English, 6/15/89, FBIS-CHI-89-114, 6/15/89. pp. 3-5.

[59] *China Daily*, 5/13/89, p. 2.

[60] Beijing Xinhua Domestic Service in Chinese, 11/13/89; FBIS-CHI-89-022, 11/20/89, p. 9.

[61] Beijing *Zhongguo Tongxun She* in English, 6/12/90; FBIS-CHI-90-114, 6/12/90, p. 4.

Cooperation in agriculture has mainly taken the form of agreements sending Chinese laborers to work on Soviet farms, but in mid-1989 a joint coffee and tea plantation was established in Hainan Province. The 50–50 venture calls for the the Chinese side to grow, harvest, and process the coffee and tea, while the Soviet side will provide equal value of chemical fertilizer, steel products, and farm machinery.[62] Other agreements for joint farming and fish-processing operations have also been discussed.

Labor transfers have also led to more extensive cooperation in the medical field. Many Chinese specialists in traditional medicine have in recent years been sent to hospitals in the Soviet Far East and Central Asian republics for short periods to provide care and to instruct Soviet doctors in some basic techniques, and in February 1990 a ten-year agreement for a jointly-run hospital was signed by the Dalian Foreign Economic and Trade Corp. and an organization in Uzbekistan city of Gulistan. The 1.5 million ruble facility will be built in Gulistan. The Chinese will provide medical instruments and 20 specialists in traditional medicine each year, while the Soviets will provide the buildings and other installations.[63]

Extensive discussions have taken place concerning cooperation in textile production, where the two countries have complementary capabilities and resources. Chinese expertise in processing, particularly of silk and cotton, is far beyond Soviet capabilities, while the Soviets excel in flax and wool manufacture. China lacks sufficient raw materials to fulfill production capacity, while the USSR is the world's second-largest cotton producer and also boasts enormous supplies of wool, flax, chemical fiber pulp, and even some silkworms.[64] Due to inadequate domestic processing capacity, the Soviet market is starving for textile goods of all types. According to a Chinese source, China's textile exports to the USSR totaled $441 million in 1986, or 30 percent of China's total Soviet exports; $250 million in 1988 and about $220 million in 1989.[65] China hopes that joint cooperation will help boost textile exports to the levels of previous years.

So far, the two sides have discussed setting up a large joint venture in Harbin to process Soviet flax into linen for resale back to the USSR. A feasibility study for the venture was completed in mid-1989.[66] Other plans call for a similar project to be set up in Baotou, Inner Mongolia.[67] Another project under consideration is a jointly-built, Chinese-run silk reeling factory to be set up in the USSR.[68] China is also interested in importing Soviet chemical fiber pulp for processing into rayon viscose, to be resold back to the USSR.[69]

Though the textile industry is highly centralized in both countries, some local cooperation has been achieved. For example, Xinjiang's Shihezi Woolen Mill and a mill in Soviet Kazakhstan reportedly established a 5,000-spindle mill in Xinjiang in November 1989. The 26 million yuan, 50–50 joint venture will utilize Soviet machinery and raw materials and Chinese labor, know-how, and certain types of equipment. The venture was expected to begin operations in early 1990.[70]

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[62] Beijing Xinhua in English, 6/8/90; FBIS–CHI–90–111, 6/8/90, p. 4.
[63] Hong Kong *Zhongguo Tongxun She* in Chinese, 4/21/89; FBIS–CHI–89–081, 4/28/89, p. 3.
[64] Beijing Xinhua in English, 2/3/90; FBIS–CHI–90–024, 2/5/90, p. 6.
[65] Ibid.; 7/6/89; FBIS–CHI–89–128, 7/6/89, p. 11.
[66] *China Daily*, 3/28/89, p. 3.
[67] Ibid.
[68] Beijing Xinhua in English, 7/6/89.
[69] Ibid.

VII. PROBLEMS IN PARTNERSHIP

For the same reasons bilateral trade is destined to play but a tiny role in each country's economic development, joint investment projects are likely to remain limited in scope, especially compared to the level of investment activity of other foreign countries in both China and the USSR. One reason is that it will not take long for each side to acquire from the other the fairly basic technologies and expertise now needed in such areas as consumer goods production. Furthermore, though even the oldest Sino-Soviet joint ventures have been in operation only for a matter of months, it is not difficult to imagine the wide range of operational difficulties they face. In a decade of experience in China, Western investors have drawn upon vast reserves of ingenuity, technology, and management skills to overcome bureaucratic obstacles, inadequate transportation and energy resources, shortages of quality raw materials, and the lack of skills, initiative, and flexibility of workers accustomed to the "iron rice bowl." And despite fairly rapid progress on the part of the Chinese in responding to Western demands and expectations, the chief obstacle to profitable investment—a nonconvertible currency—is no closer to being resolved than it was 10 years ago. Sino-Soviet projects face these same problems twice over, with neither the experience nor the resources other foreign investors can call upon to deal with them. In view of these obstacles, many of the reported joint-venture agreements are unlikely to make it past the paper stage.

Nevertheless, Sino-Soviet cooperation has the potential, like border trade, to play a fairly significant role on the local level in increasing both sides' experience in identifying markets, evaluating partners, assessing the viability and profitability of projects, dealing with cultural and language barriers in the workplace, and coming up with creative ways to solve problems of sourcing materials and repatriating profits—such as taking payment in diesel engines, for instance. Given the small size and local scope of most Sino-Soviet ventures, they represent a low-risk way for each side to experiment with the opportunites and obstacles of international commerce. China's plans to develop the port of Heihe as a major rail entrepôt for the transshipment of goods from Northeast Asia to Europe,[71] along with Soviet plans to exploit Siberian resources, will both be well-served by the increasing commercial connections and business experience gained by both sides in their struggles to conceive and operate viable joint ventures.

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[70] *China Daily*, 3/28/89.

[71] Beijing Xinhua in English, 11/11/89; FBIS–CHI–89–115, 11/14/89, pp. 15–16.

VIII. China Perceives a New Threat

The long-term prospects for cooperation are not completely positive, however. The upheaval in China in 1989 has fostered among its leaders an alarmist view of the world, and specifically, of the USSR, whose reforms seem to pose a direct threat to China's tenuous economic and social stability. While a threatening impression of the USSR has never been completely absent from Chinese strategic view, the current version took firmer hold among the Chinese leadership in 1989, when Soviet leader Mikhail Gorbachev visited Beijing to formally renew state-to-state ties. What should have been a triumphal occasion for both countries was marred for Chinese leaders when Gorbachev was praised by the demonstrators in Tiananmen Square for reforming Soviet society through glasnost and perestroika. Gorbachev further enraged the leadership by making public remarks that appeared sympathetic to the students' demands. Later that year, the rapid fall of one after another of East Europe's communist regimes sent shock waves through Beijing—the toppling of Romania's Nicolae Ceaucescu, a personal friend of many Chinese leaders, hit particularly hard—and deepened Chinese suspicion of Gorbachev and his apparent willingness to preside over the demise of Communism. In particular, the Soviet government's abolition in February 1990 of the constitutional guarantee of a "leading role" in society for the Communist Party deeply disturbed the Chinese and further highlighted the ideological divide between Beijing and Moscow.

In an effort to understand how the Soviet reform process could have such widespread and dramatic effects, and to evaluate what the implications might be for China, the Chinese Communist Party sent a fact-finding delegation to the USSR in mid-1989. The delegations's analysis, submitted near the end of the year, made three main points that add up to a triple threat for China. First, the sweeping scope and pace of Soviet reforms, and concurrent efforts to reduce the USSR's image as a global military threat, "has captured the imagination of the world." [72] As a result, China's strategic importance to the world has been correspondingly reduced, and its own decade-long reform program has lost significance. Thus the USSR now overshadows China as a favored recipient of international capital and technology. Noting that "The USSR has richer natural resources, a more solid infrastructure, and a higher level of domestic market than China," the delegation's report expresses fears that because of the reforms, the USSR has become irresistibly appealing to the same Western companies whose technology and resources China would like to attract. The report also notes with alarm that Western funds has been "pouring in" to the Soviet Union over the past two years, and that Western companies have rushed to establish joint ventures.

A second potential threat, according to this analysis, is the Soviet plan to develop Siberia's abundant resources. This would have the dual effect of attracting and absorbing even greater amounts of available international assistance, thus reducing the portion available for China, and enhancing the USSR's economic strength, to China's inevitable detriment. Furthermore, as the Soviet economy develops and becomes integrated with the world economy, China will lose market share abroad.

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[72] The quotations and summaries of the delegation's analysis in the following pages are all taken from a translation of the report published in three editions of Hong Kong *Tang Tai* in Chinese: No. 13, 2/90. pp. 35-36; FBIS-CHI-90-040, 2/28/90, pp. 7-9; No. 14, 3/90, pp. 17-18; FBIS-CHI-90-045, 3/7/90, pp. 5-7; No. 15, 3/90, pp.20-21; FBIS-CHI-90-0523, 3/16/90, pp. 6-8.

The successful implementation of perestroika and attraction of Western technology and capital leads, in the delegation's analysis, to a third threat: That the Soviet standard of living will dramatically increase relative to China's, thus exacerbating Chinese popular discontent and causing social instability on a scale that could dwarf the Tiananmen Square demonstrations.

The Chinese response to this perceived threat has several parts. First, extensive criticism of the USSR has been made a priority of the official propaganda machine. The CPC's official directive on criticism of Soviet "revisionism," adopted in February 1990—just days after the Soviet government abolished the constitutional guarantee of the Communist Party's "leading role"—stated that all CPC members must be "thoroughly educated" on the "real nature" of Soviet reforms and how they deviate from the "true" path of socialism. Party members are urged, for example, to study theoretical essays on Soviet revisionism dating back to the 1960s, and to focus on such sources of inspiration as the old Lei Feng campaign.[73] Unlike the strident, public polemics of the 1960s, however, this new campaign is intended exclusively for internal consumption. While the leadership views its position as consistent with the policy of "not interfering with other countries' internal affairs," this is a case of making a virtue out of necessity, since public criticism of Soviet reforms would foster the world's image of a progressive, reformist USSR versus a reactionary, regressive China.[74]

In addition to the propaganda campaign, the Chinese are taking certain steps recommended by the fact-finding delegation to counter the USSR's "aggressive behavior." The report lists four types of measures to accomplish this. The first, "To make good use of China's initiatives in its relations with powers and issues of sensitive regions to check Soviet strategy," essentially means that China should try whenever possible to undermine Soviet interests in Asia and prevent its influence from expanding there. One way to do this would be for China to discourage dialogue between North and South Korea, since friendly relations could clear the way for the USSR to expand economic links with South Korea and thus lead to new export markets and assistance in developing Siberian resources. China could also try to hamper the development of Soviet links with Japan and Taiwan, though these can be less directly influenced.[75]

The second recommendation is "to make longer strides in reform and opening up in China, to shift the international community's focus of attention from the USSR. For example, consideration can be given to adopting major action in spheres that the USSR has not touched upon to date, such as ownership." The Chinese will have to move quickly to outpace the USSR, however, since Gorbachev has stepped up the pace of reform, and as of October 1990 was considering permitting private ownership as part of a radical economic restructuring plan.[76]

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[73] Hong Kong *Cheng Ming* in Chinese, No. 150, 4/1/90, pp. 6–8; FBIS-CHI-90, 4/3/90, pp. 6–9.

[74] Hong Kong Agence France Presse, 2/7/90; FBIS-CHI-90-026; 2/7/90, p. 1.

[75] Hong Kong Tang Tai, Ibid.

The third proposal urges that China "lose no time in utilizing international economic resources ... including large-scale foreign loans and attracting direct foreign investment ..." [77] Time is of the essence here, since the USSR's reforms are fast providing a more attractive economic infrastructure to foreign governments and companies alike. China's loss of substantial sums of promised and hoped-for funds in the wake of the Tiananmen massacre increases the sense of urgency.

The fourth recommendation is for China to "grasp the opportunity" presented by Soviet desire to exploit resources in the Far East "to ease China's basic problems of overpopulation and shortage of raw materials. We may consider initialing an accord with the USSR on long-term supply of raw materials, and providing the USSR with labor. ..." [78] Fearing that Soviet development will outpace China's and reduce future Soviet needs for Chinese materials and manpower, China should try to lock in demand for its resources with long-term agreements.

In view of the threat posed by the USSR's economic and political reforms, the delegation sums up by calling for caution in expanding trade and economic links with the USSR. Guangdong companies in particular are advised to slow the pace of ties with Soviet enterprises. The stipulation that the overall trade relationship should develop "naturally," and not at "excessive speed," [79] is intended both to ensure that the Soviet economy is not becoming stronger at China's expense, and that local contacts do not lead to the spread of glasnost and perestroika-like ideas in Chinese society.

Chinese fears of being imminently outpaced by Soviet economic development seem extremely far-fetched in the late 1980s, as Soviet citizens riot to protest the lack of basic foodstuffs and cigarettes [80] while Chinese enjoy unprecedented access to a wide variety of nonrationed consumer goods even in the midst of a recession. Yet as the denouement of the Tiananmen Square demonstrations harshly revealed, China's current leadership sees itself and its cause embattled on every side—indeed, there is perhaps no surer evidence of paranoia than the conviction that the Soviet economy presents a threat to any other country other than its own. The Chinese have learned many useful lessons in the past ten years of the open door, however, and as time goes by, perhaps they will also come to see that the "threat" of Soviet economic competition is not as great as it may appear today.

IX. Pragmatism Will Prevail

Despite their long-term fears over economic competition and social instability, Chinese leaders nevertheless pragmatically perceive the various benefits of today's Sino-Soviet trade ties, and will encourage them to expand in a controlled way by means of government-to-government accords, cooperative infrastructure development, and investment in local projects that transfer needed technology and raw materials to China. Despite their continued commitment, in the face of immensely discouraging odds, to structuring a workable society based on Communist principles, the Chinese have nevertheless learned from a decade of doing business with the West—and in particular, from the aftermath of the Tiananmen crisis—to allow for a more flexible relationship between politics and trade. While Western governments condemned the Chinese leadership for the massacre of demonstrators, their companies and financial institutions have continued to seek business in China—and continued to profit. Turning this lesson to China's own advantage, leaders in Beijing realize that sharp political and ideological differences with Gorbachev's government need not affect mutually beneficial commercial ties between the two countries. This new awareness is the chief reason to expect continued slow expansion of the Sino-Soviet economic relationship. It also gives reason to hope that China will continue, in fits and starts, on the path of economic reform that must eventually lead to profound and positive social change as well.

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[76] Ibid.

[77] Ibid.

[78] Ibid.

[79] Ibid.

[80] "1,000 March on Soviet Party Office and Riot Over Food Shortages," *New York Times*, 8/26/90, p. 5.

APPENDIX

Date	Swiss franc value	US$ value
1981	1.964	1
1982	2.030	1
1983	2.099	1
1984	2.349	1
1985	2.457	1
1986	1.789	1
1987	1.491	1
1988	1.463	1
1989	1.635	1
1990:		
Jan	1.515	1
Feb	1.487	1
Mar	1.511	1
Apr	1.487	1
May	1.417	1
Jun	1.425	1
Jul	1.393	1

Source: International Monetary Fund

Date	Chinese yuan value	US$ value
1981–85	1.3	1
Dec 1985	3.2	1
Dec 1986	3.7	1
Dec 1989	4.7	1

Source: US-China Business Council

The ruble exchange rate is fixed against a market basket of currencies including the dollar, yen, and deutschemark, and has averaged 1 : US $1.60 in recent years.

Source: PlanEcon, Washington, DC.

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